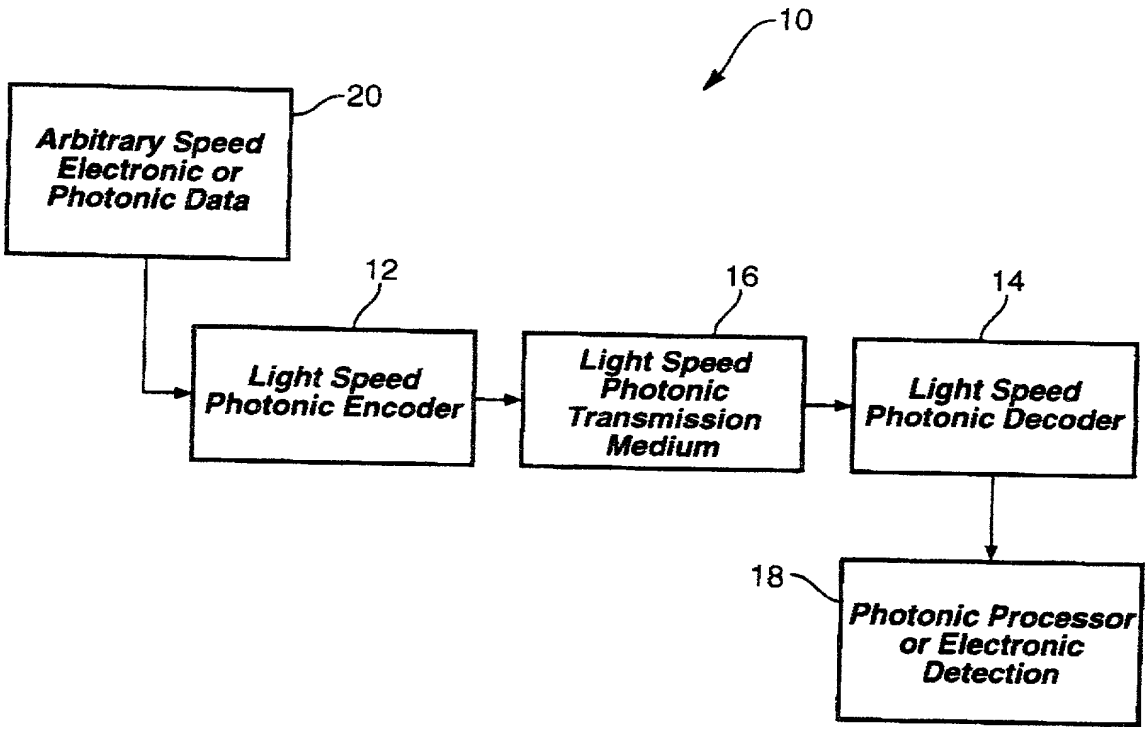


FIG. 1

2807.2.4.10

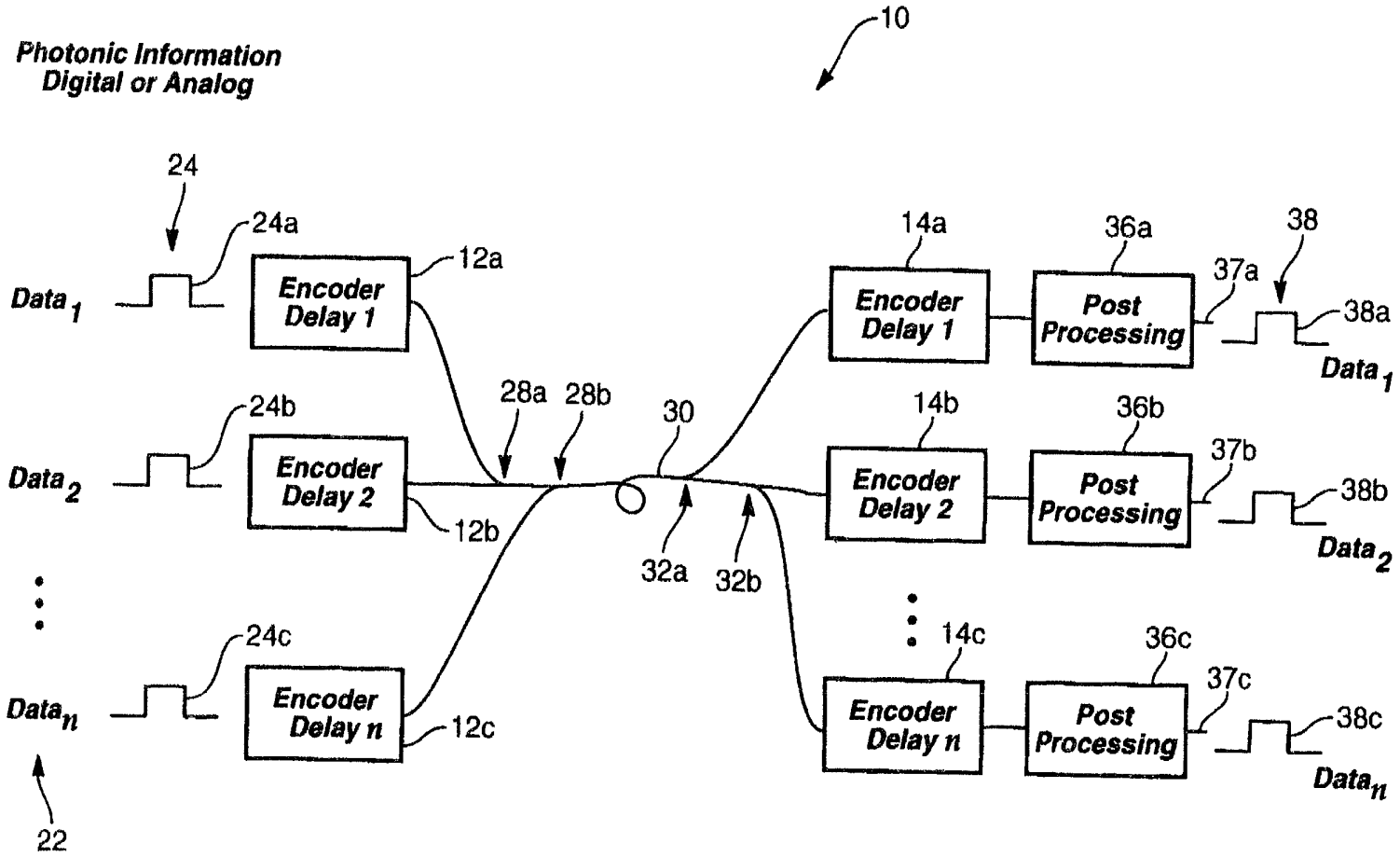
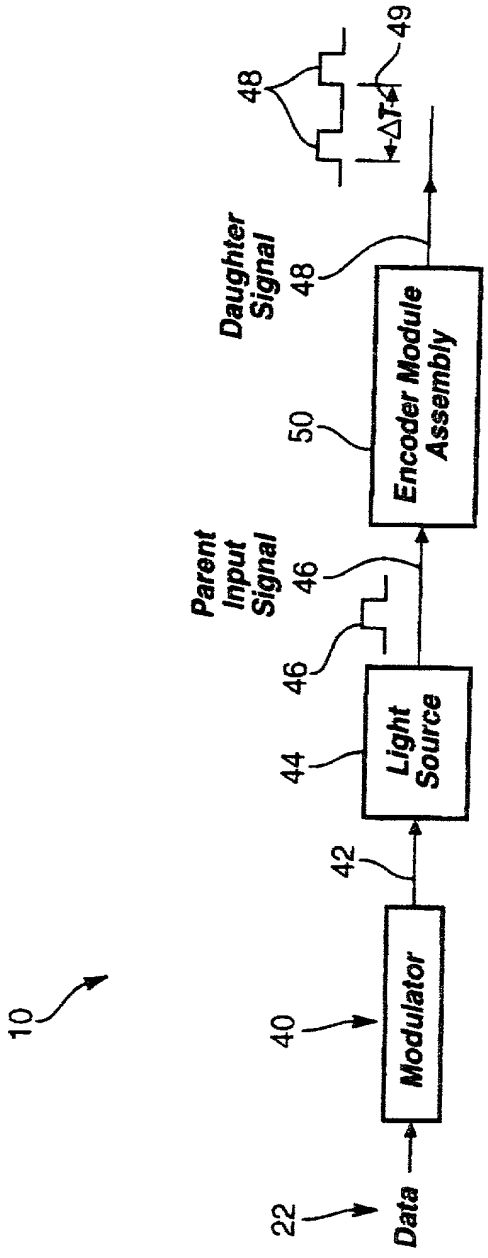


Fig. 2

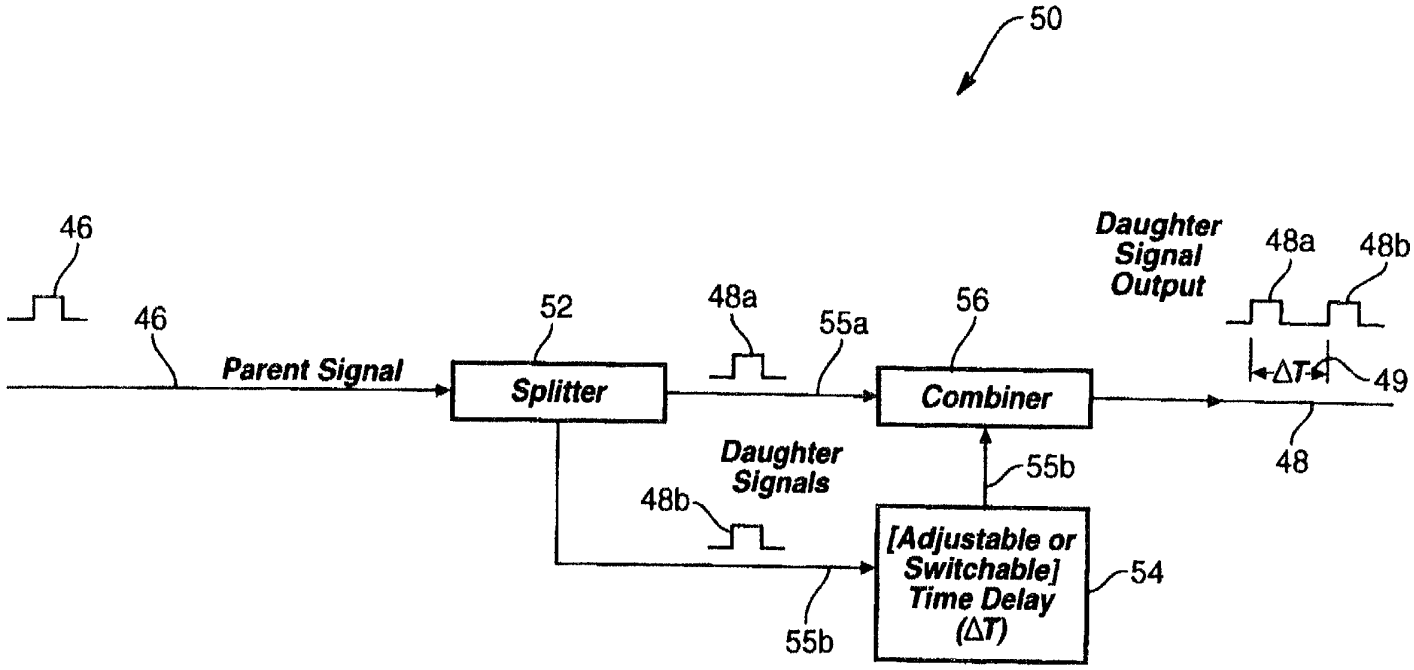
2807.2.4.10



Differential Delay Multiplexer Sender/Encoder

Fig. 3

2807.2.4.10



Differential Delay Multiplexer (DDM) Sender/Encoder

Fig. 4

2807.2.4.

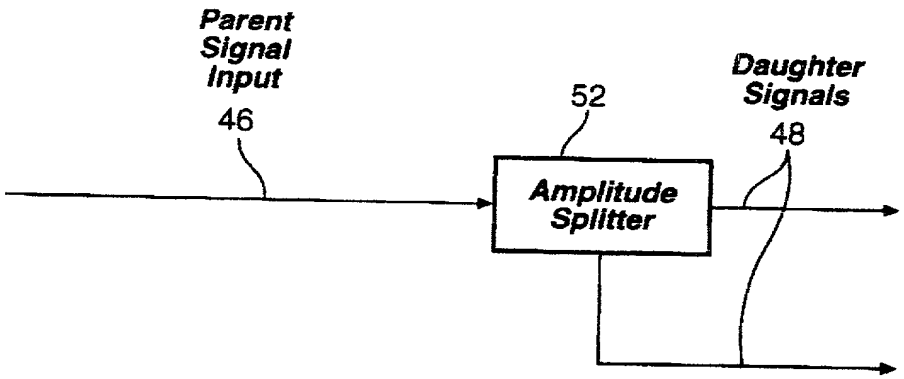
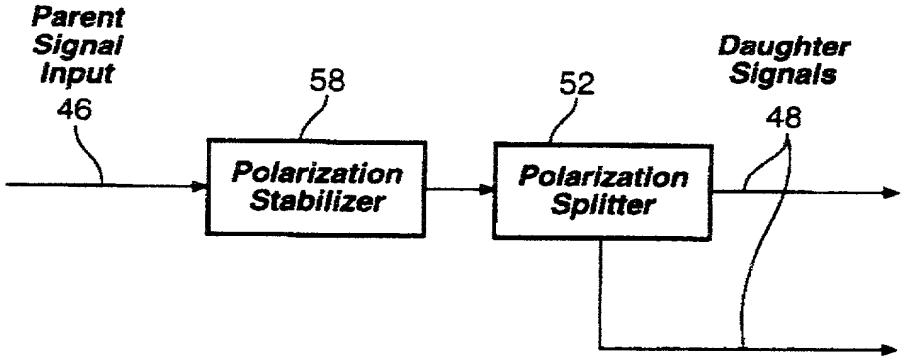


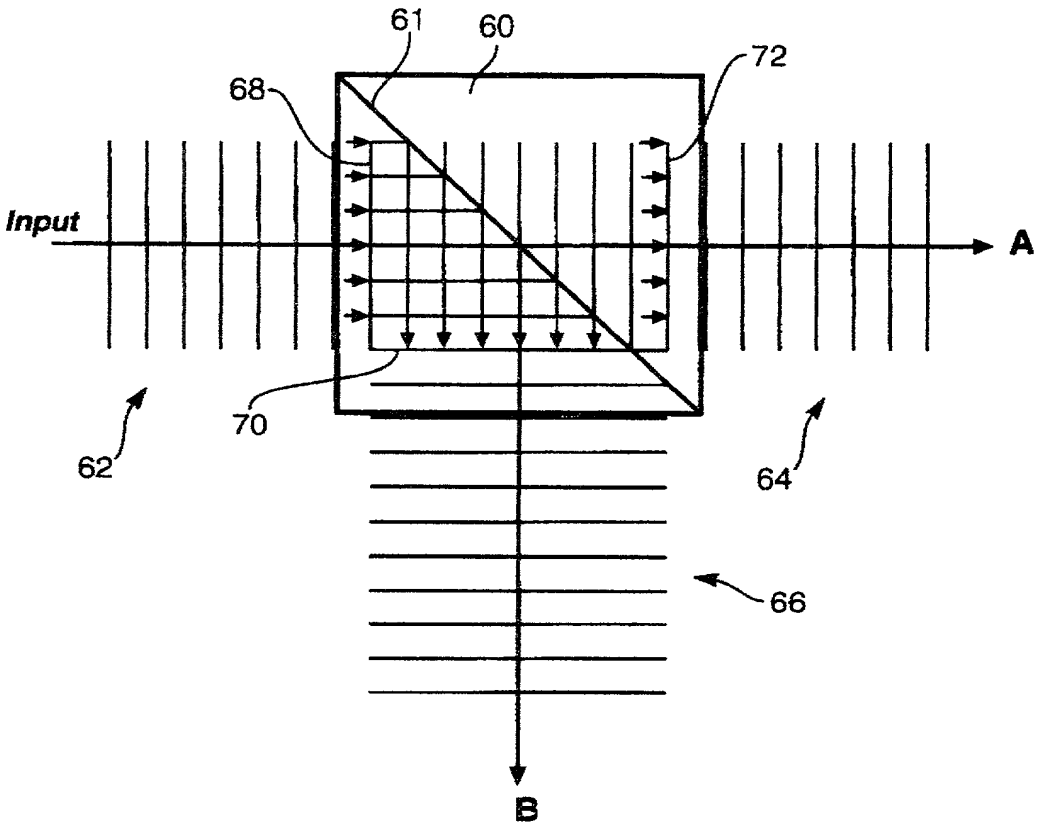
FIG. 5



Splitting Criteria

FIG. 6

2807.2.4.



Amplitude or Polarization Splitter

FIG. 7

2807.2.4.

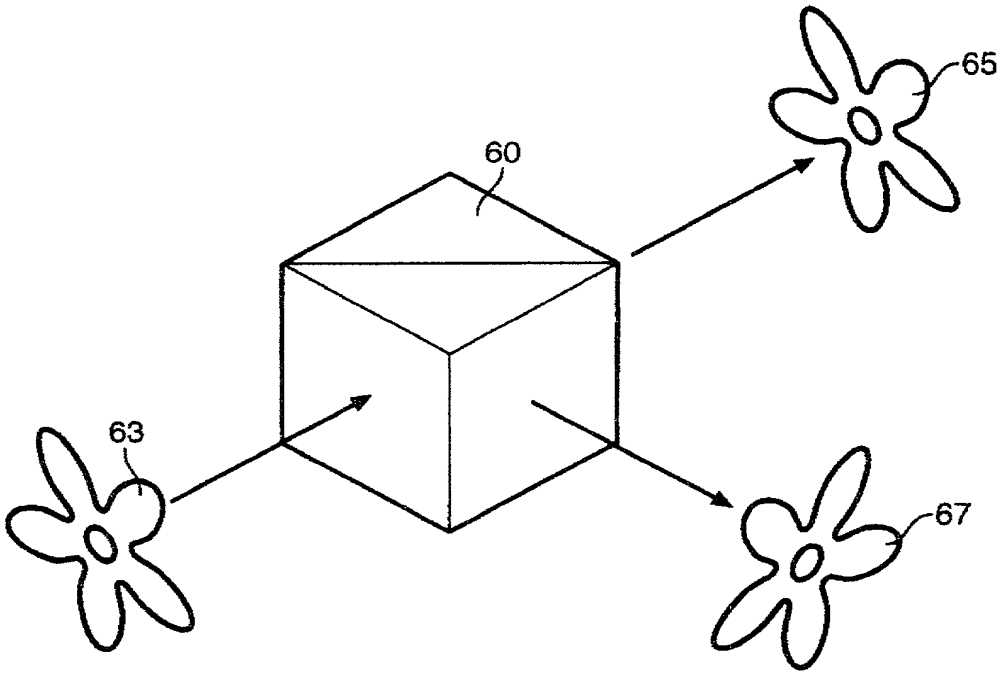
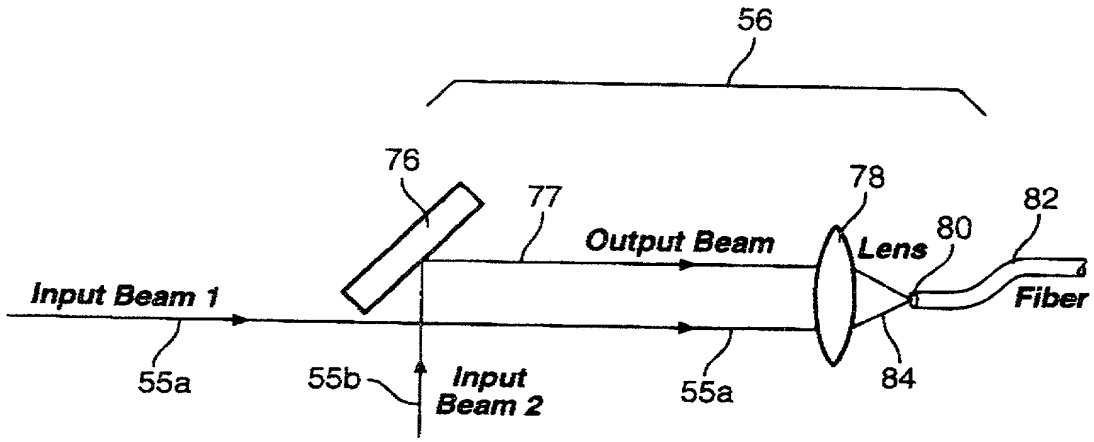


Image Signals Which Maintain Spatial Information

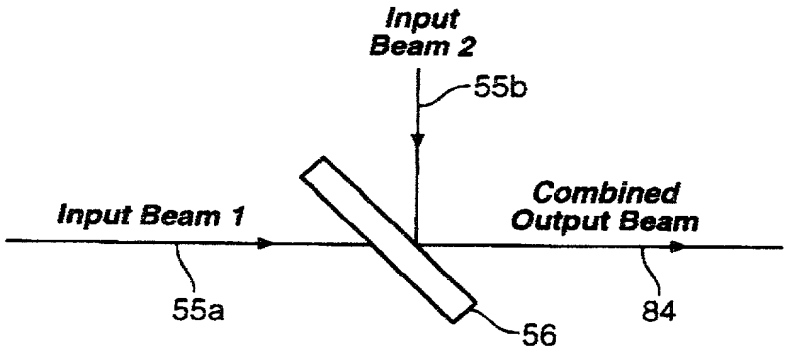
FIG. 7A

2807.2.4.



Beam Combiner

FIG. 8



Amplitude or Polarization Combiner

FIG. 9

2807.2.4.

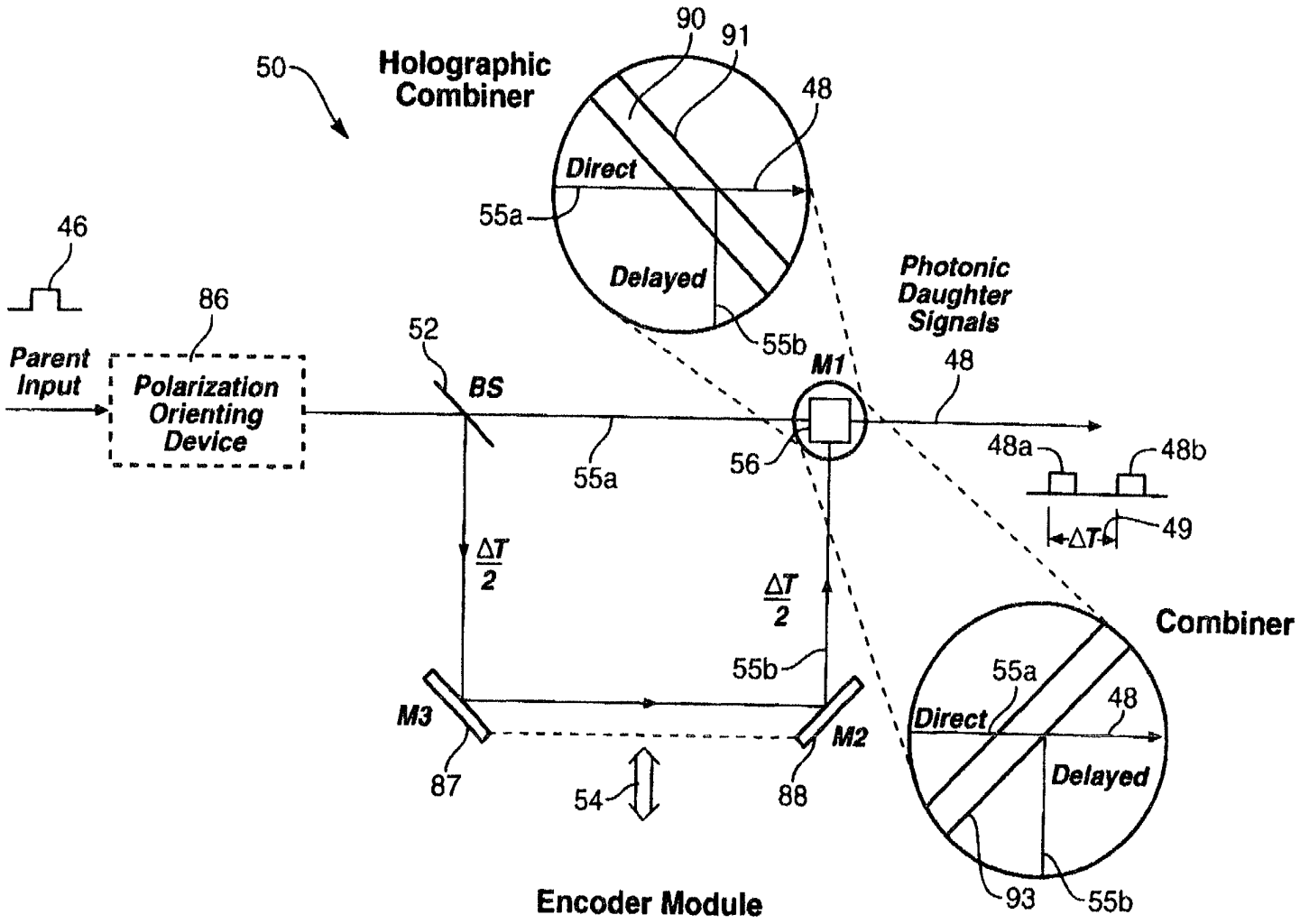
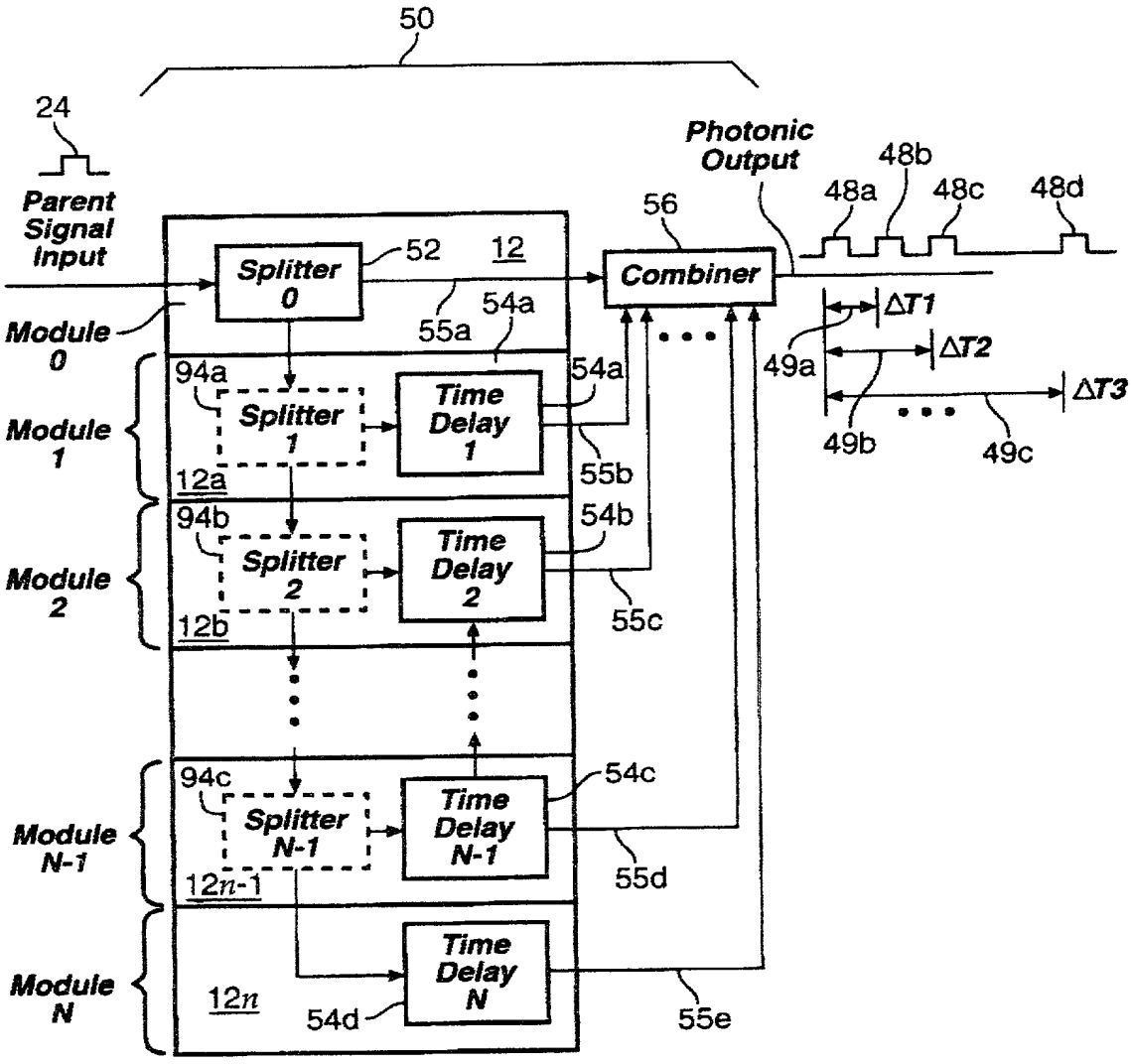


Fig. 10

2807.2.4.



Composite Encoder Module Assembly

FIG. 11

2807.2.4.

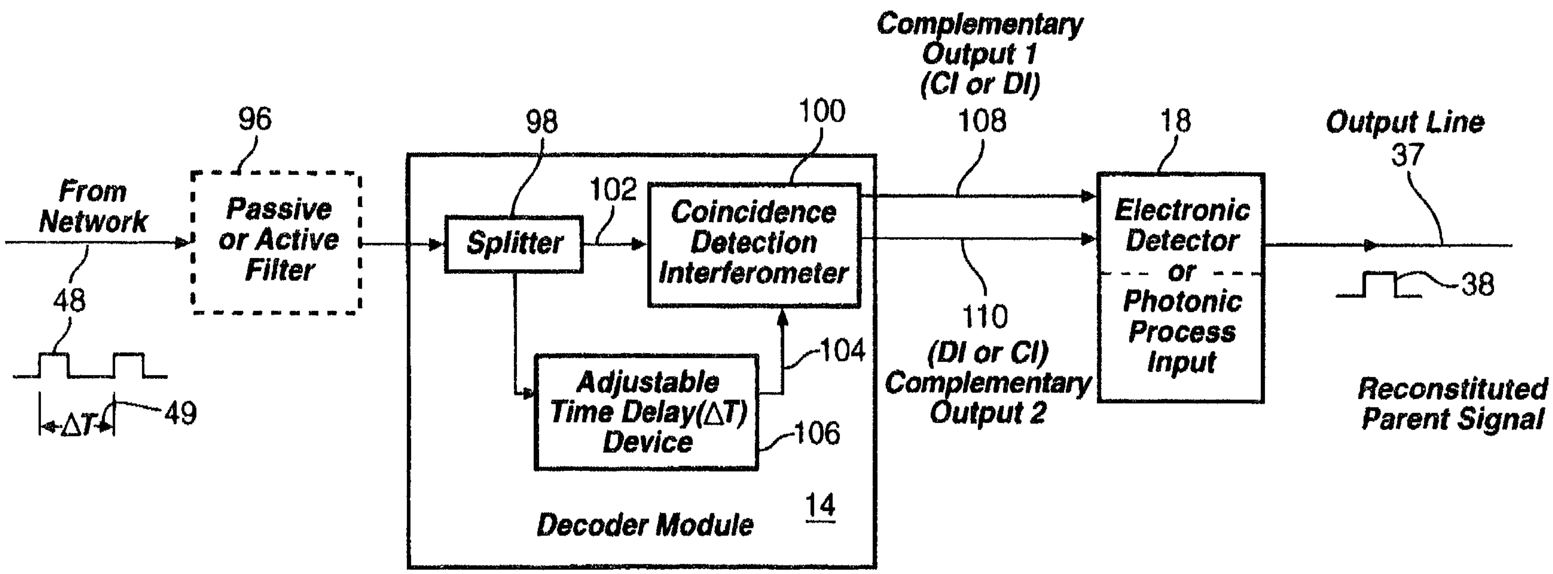

From
Network
48
49
ΔT
96
Passive
or Active
Filter
98
Splitter
102
100
Coincidence
Detection
Interferometer
104
Adjustable
Time Delay(ΔT)
Device
106
Decoder Module
14
Complementary
Output 1
(CI or DI)
108
110
(DI or CI)
Complementary
Output 2
18
Electronic
Detector
or
Photonic
Process
Input
Output Line
37
38
Reconstituted
Parent Signal

Fig. 12

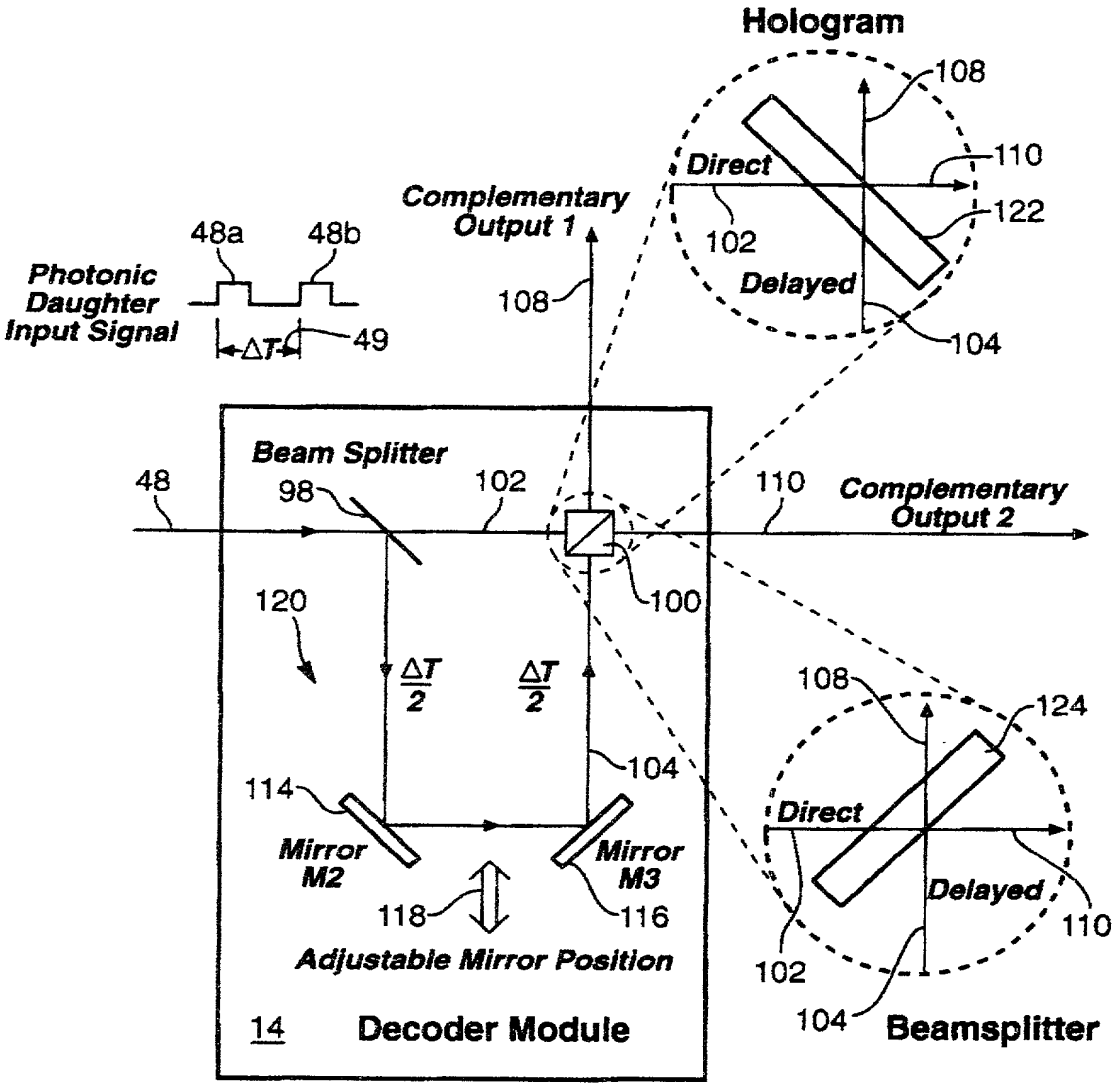

Hologram
108
110
Direct
122
Complementary Output 1
102
Delayed
104
48a
48b
Photonic Daughter Input Signal
ΔT
49
108
Beam Splitter
48
98
102
110
Complementary Output 2
100
120
ΔT/2
ΔT/2
104
114
Mirror M2
Mirror M3
118
116
Adjustable Mirror Position
14
Decoder Module
108
124
Direct
Delayed
110
102
104
Beamsplitter

FIG. 13

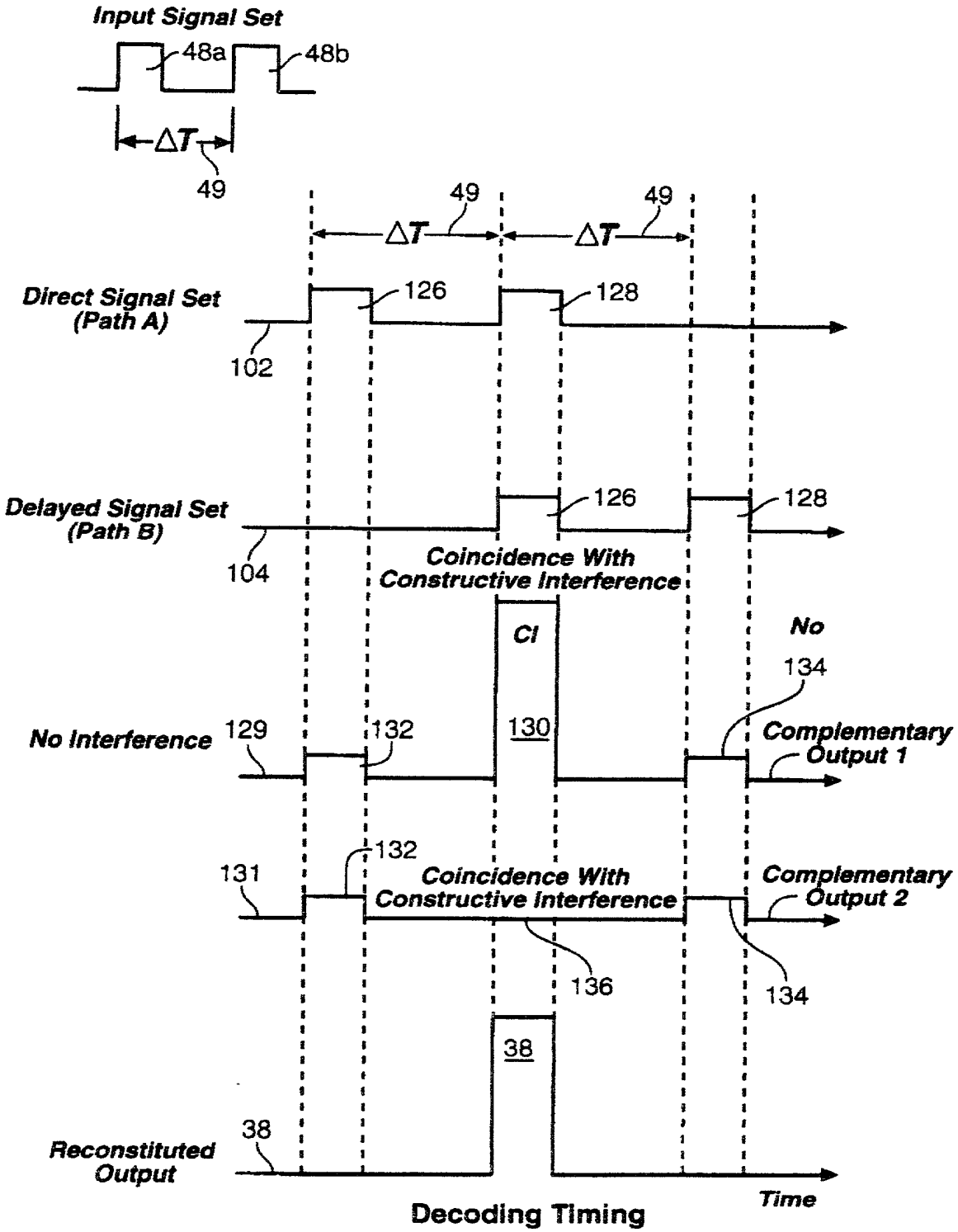

Input Signal Set
48a
48b
ΔT
49
49
49
ΔT
ΔT
Direct Signal Set
(Path A)
126
128
102
Delayed Signal Set
(Path B)
126
128
104
Coincidence With
Constructive Interference
CI
No
134
No Interference
129
132
130
Complementary
Output 1
132
131
Coincidence With
Constructive Interference
Complementary
Output 2
136
134
38
38
Reconstituted
Output
Time
Decoding Timing

FIG. 14

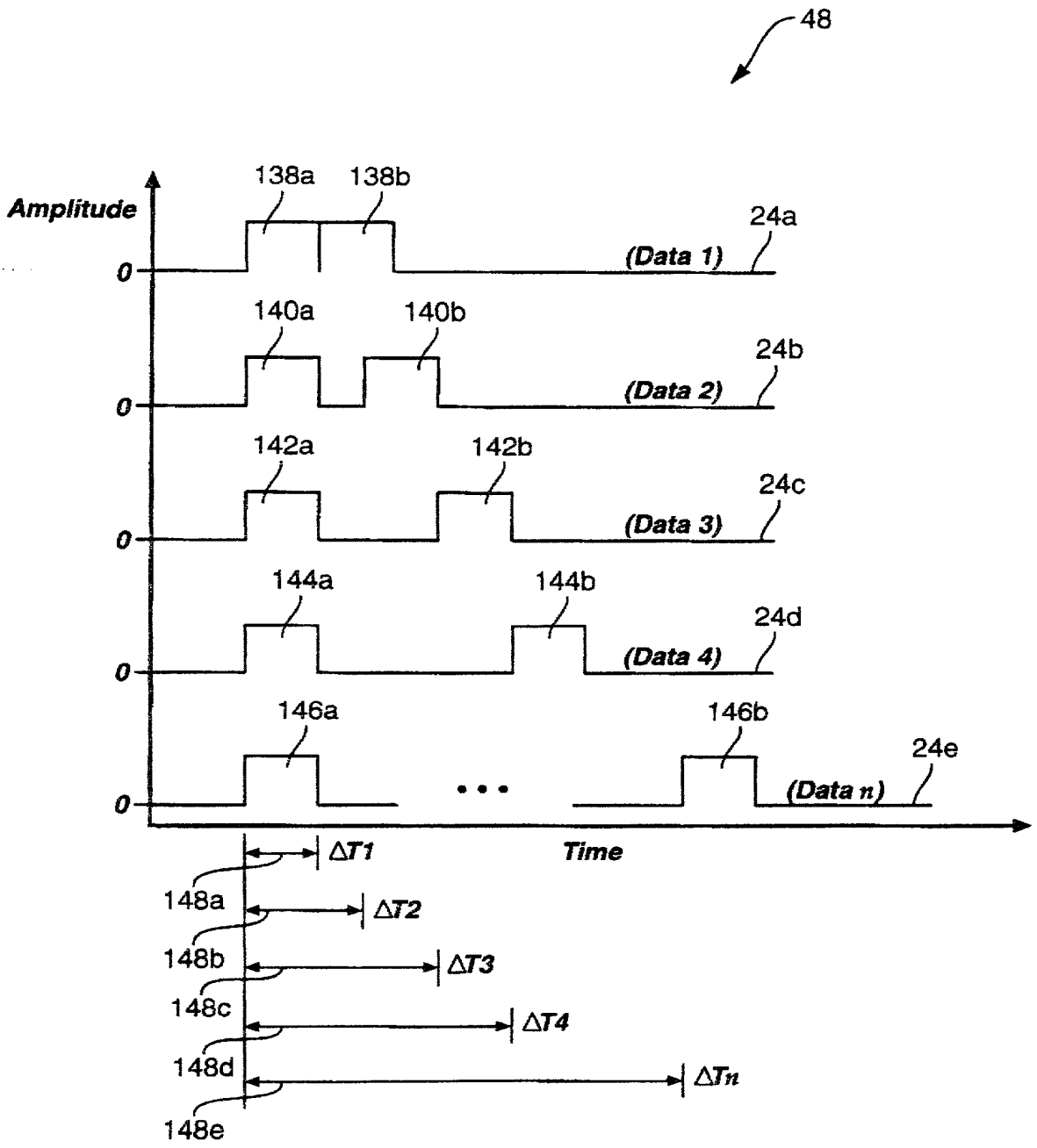

48
Amplitude
0
138a
138b
24a
(Data 1)
140a
140b
24b
(Data 2)
142a
142b
24c
(Data 3)
144a
144b
24d
(Data 4)
146a
146b
24e
(Data n)
Time
ΔT1
148a
ΔT2
148b
ΔT3
148c
ΔT4
148d
ΔTn
148e

Fig. 15

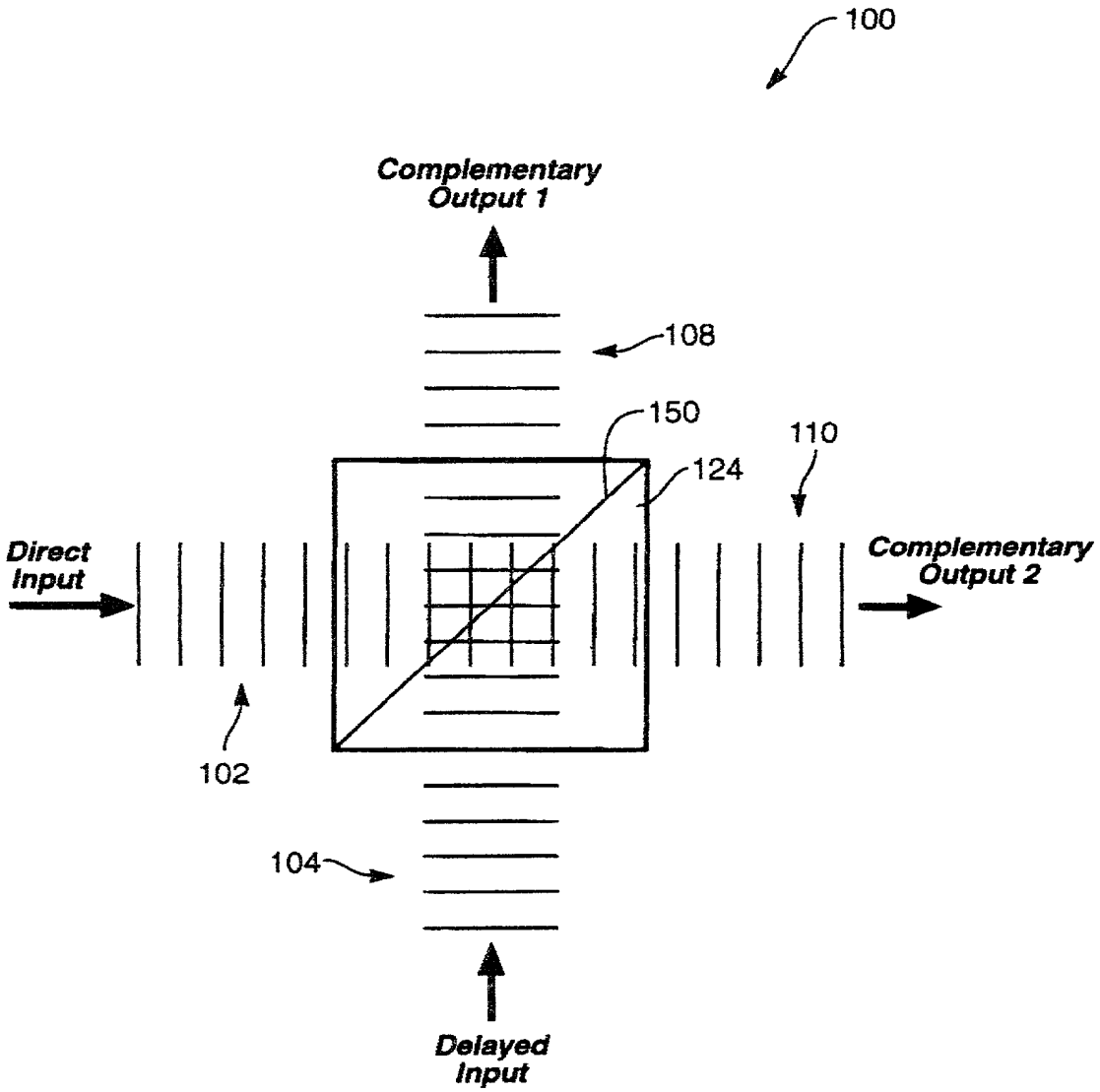

100
Complementary Output 1
108
150
110
124
Direct Input
Complementary Output 2
102
104
Delayed Input

Fig. 16

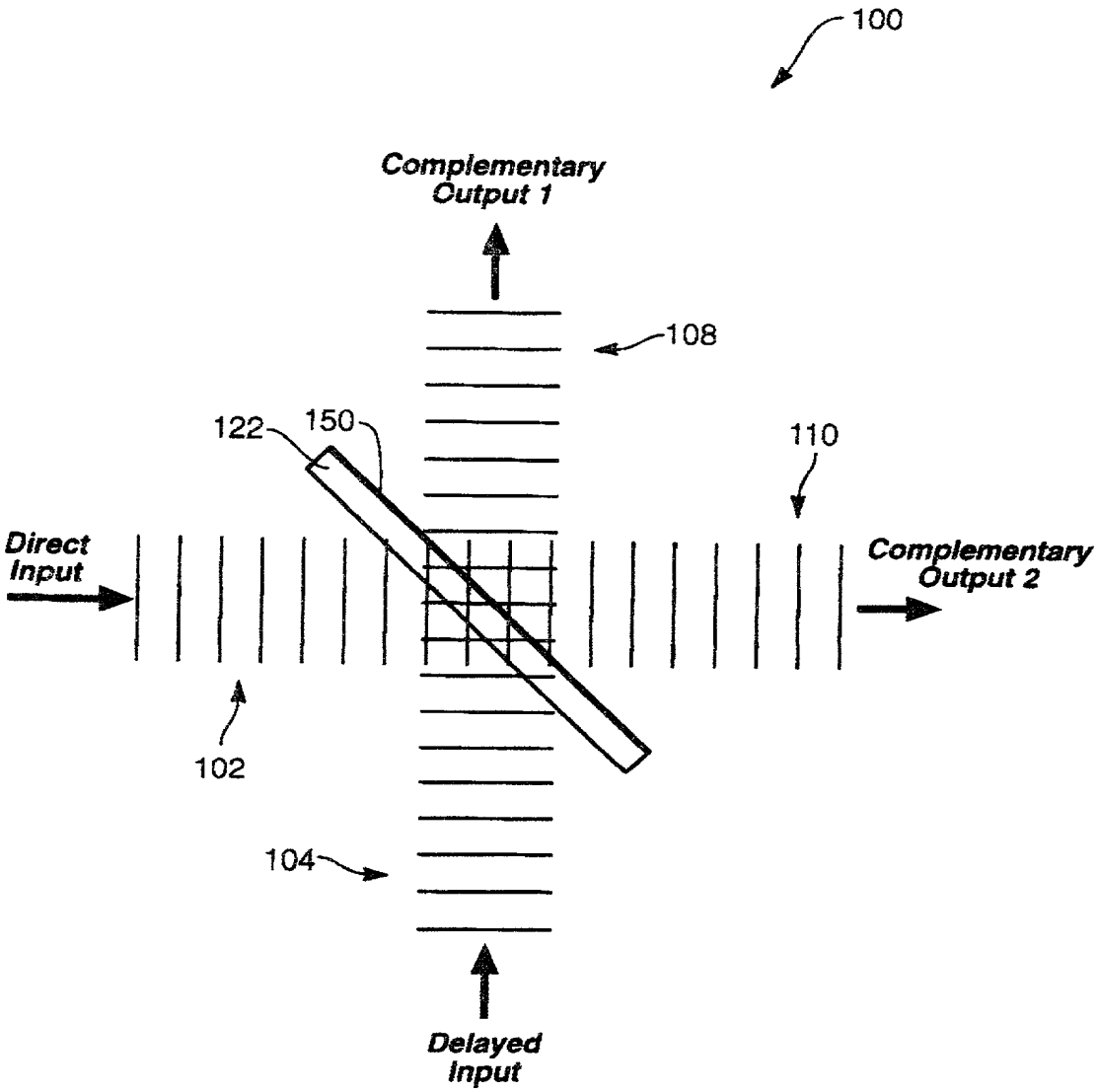

100
Complementary Output 1
108
122
150
110
Direct Input
Complementary Output 2
102
104
Delayed Input

Fig. 17

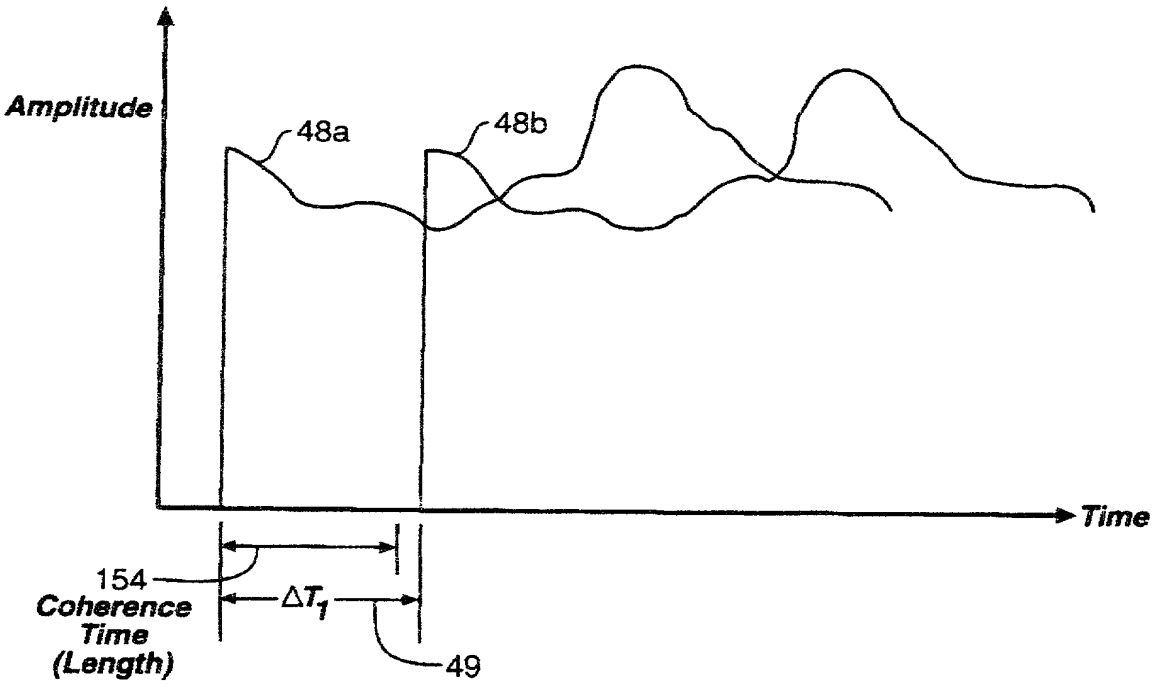

Amplitude
48a
48b
Time
154
Coherence
Time
(Length)
ΔT_1
49

Fig. 18

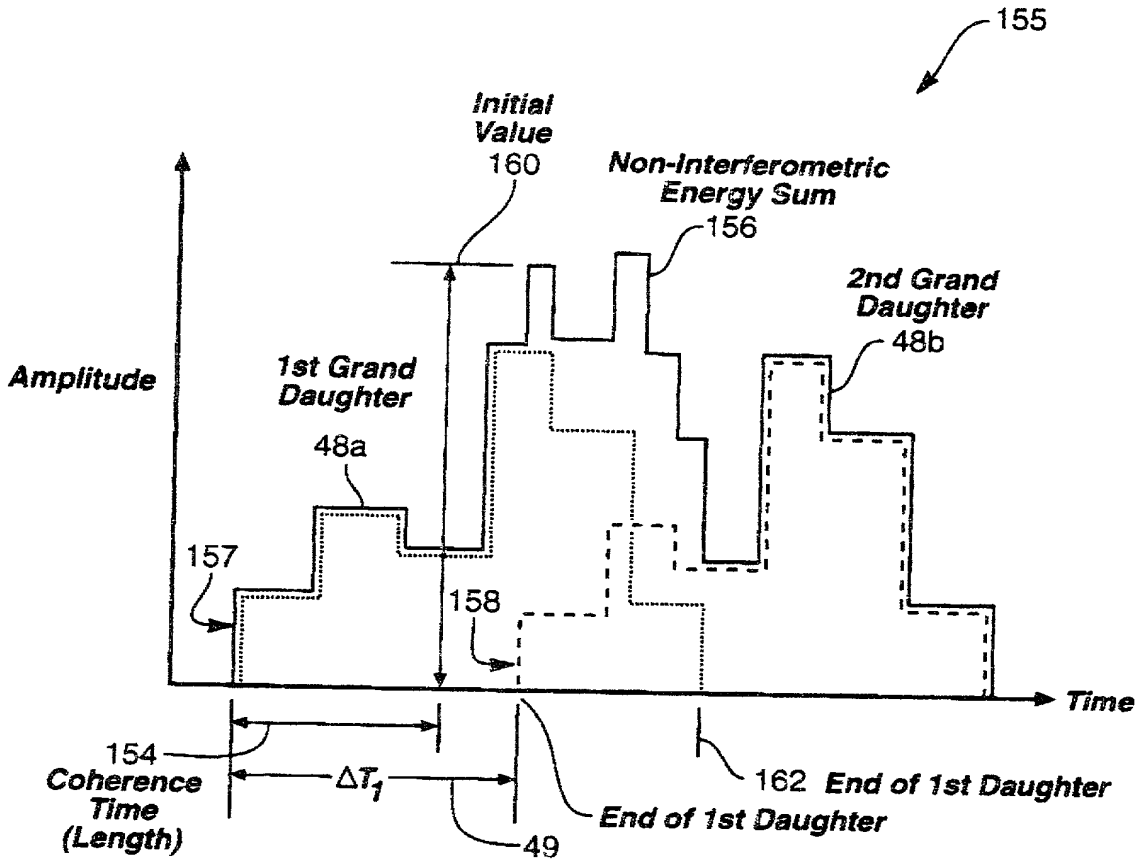


Fig. 19

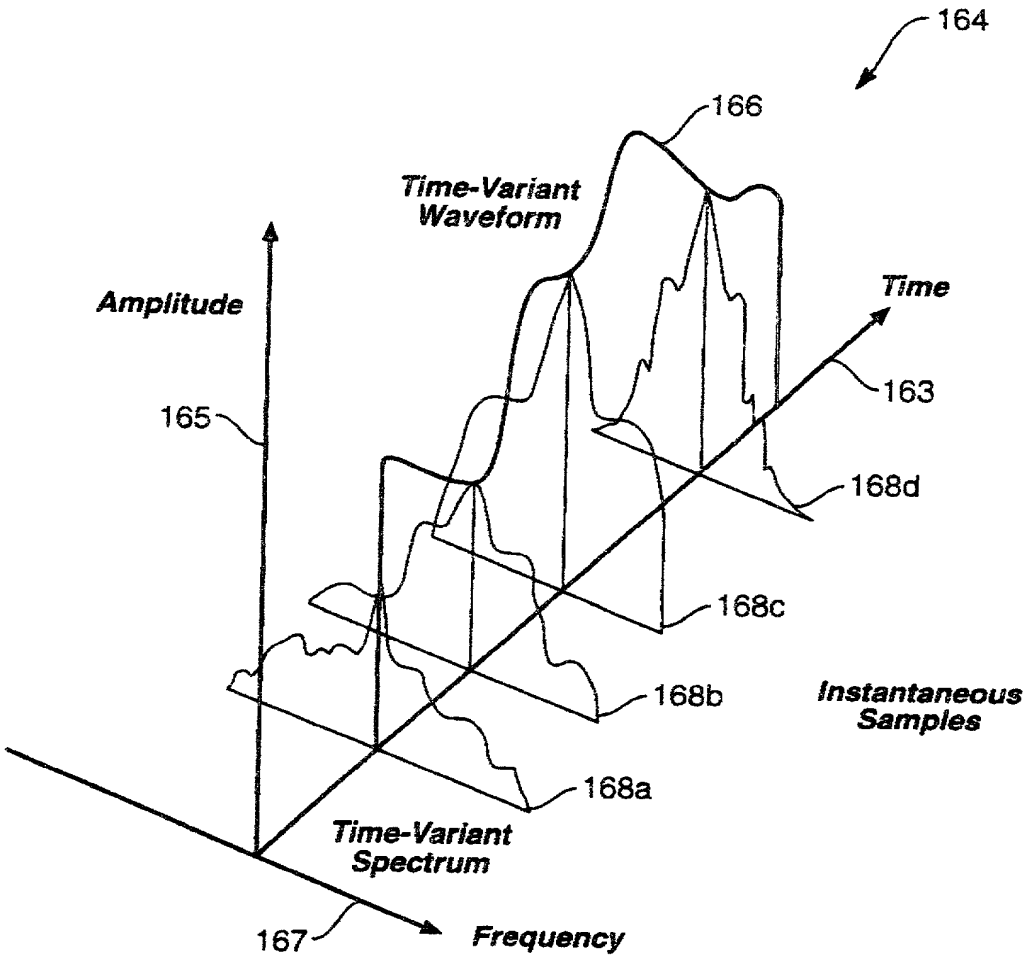

164
166
Time-Variant
Waveform
Amplitude
Time
163
165
168d
168c
168b
Instantaneous
Samples
168a
Time-Variant
Spectrum
167
Frequency

Fig. 20

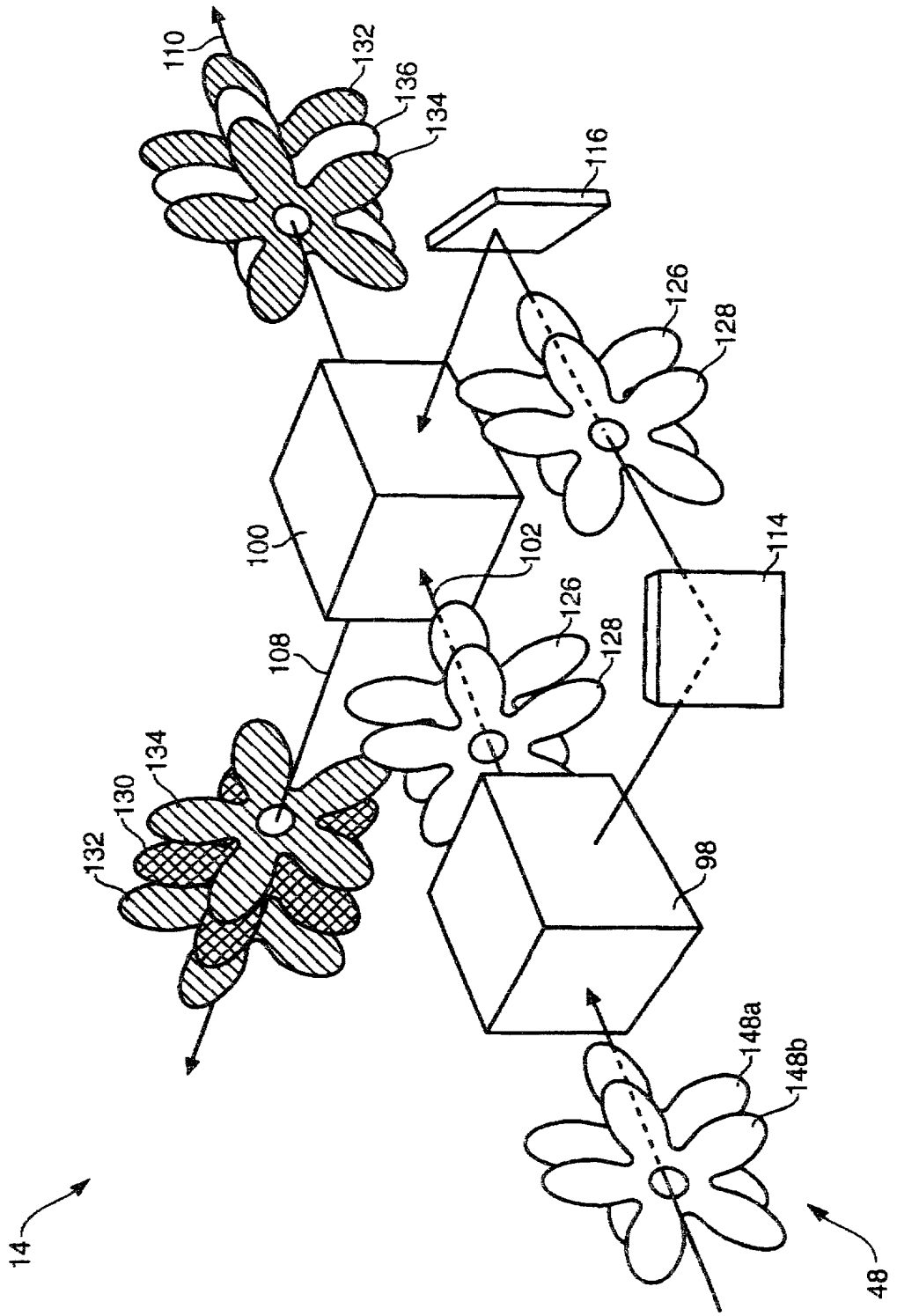
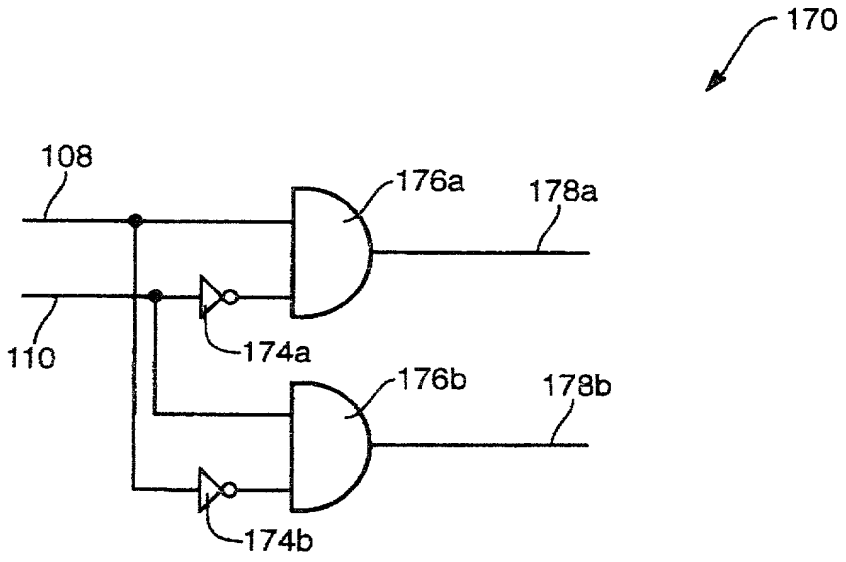
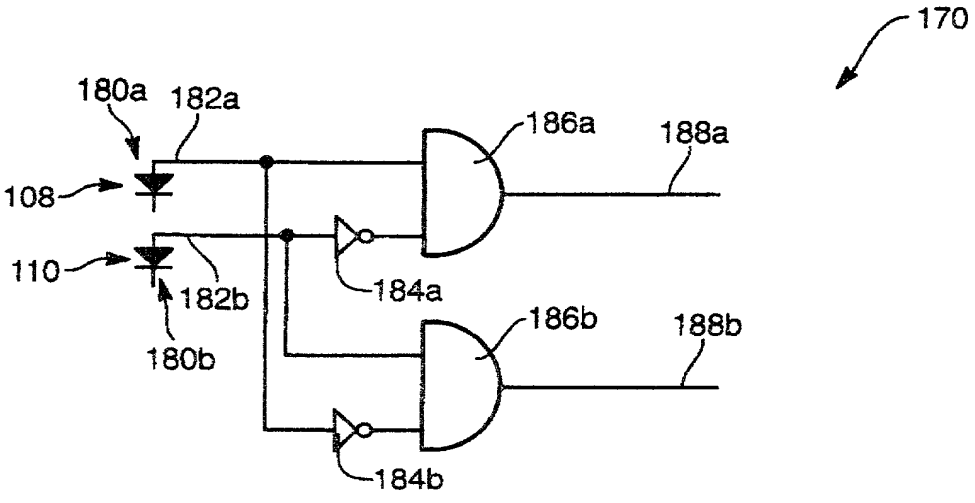

14
110
132
136
134
116
126
128
100
102
114
108
126
128
134
130
132
98
148a
148b
48

Fig. 21



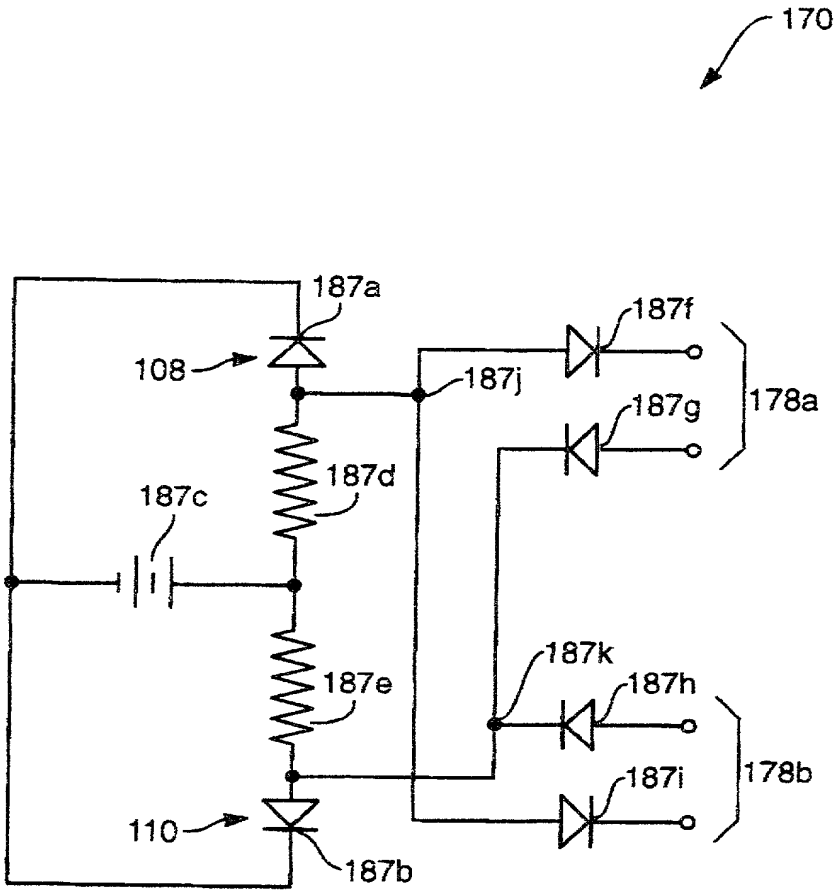
Photonic Processor

Fig. 22



Electronic Processor

Fig. 23A



Electronic Processor

Fig. 23B

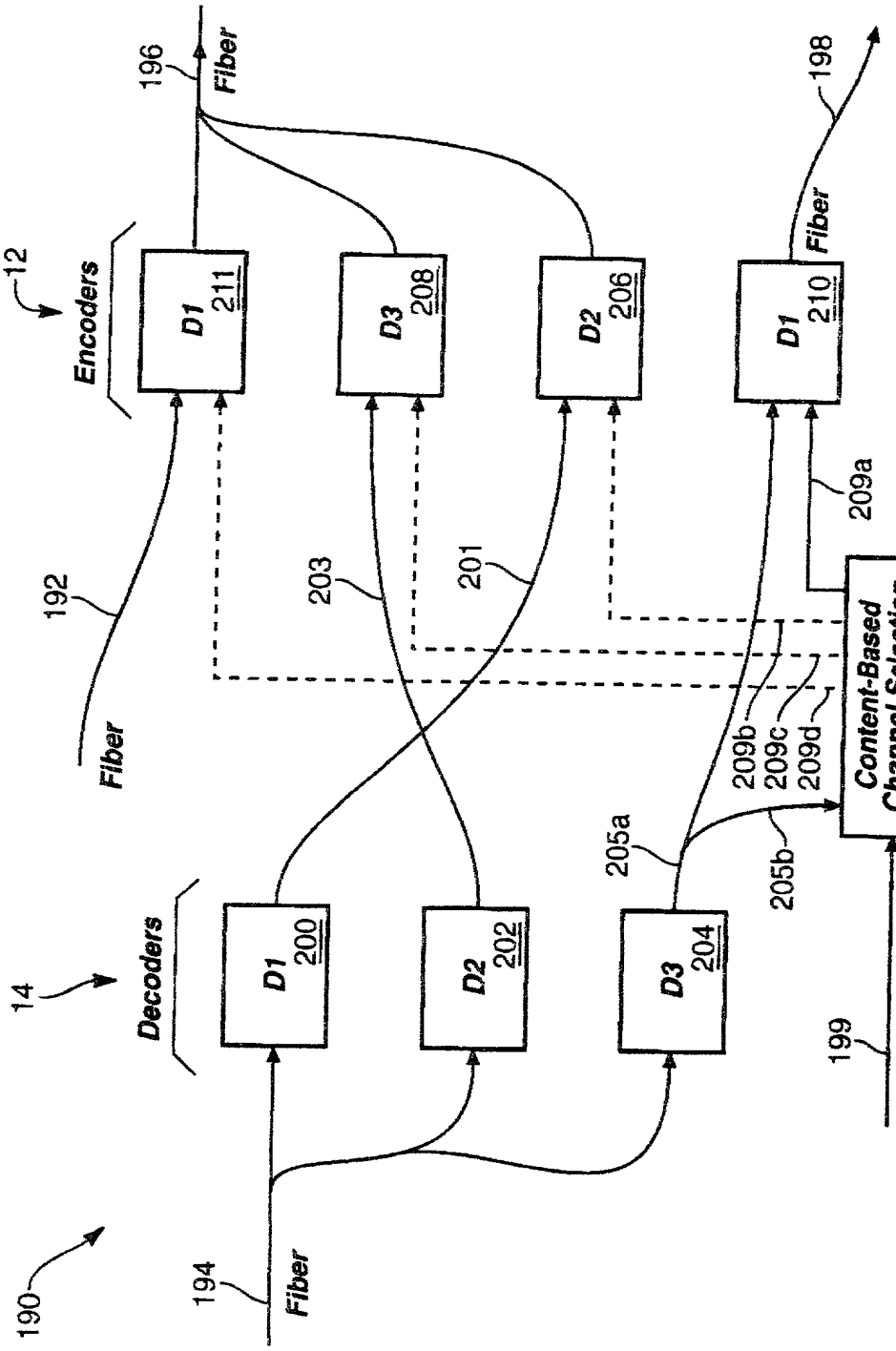
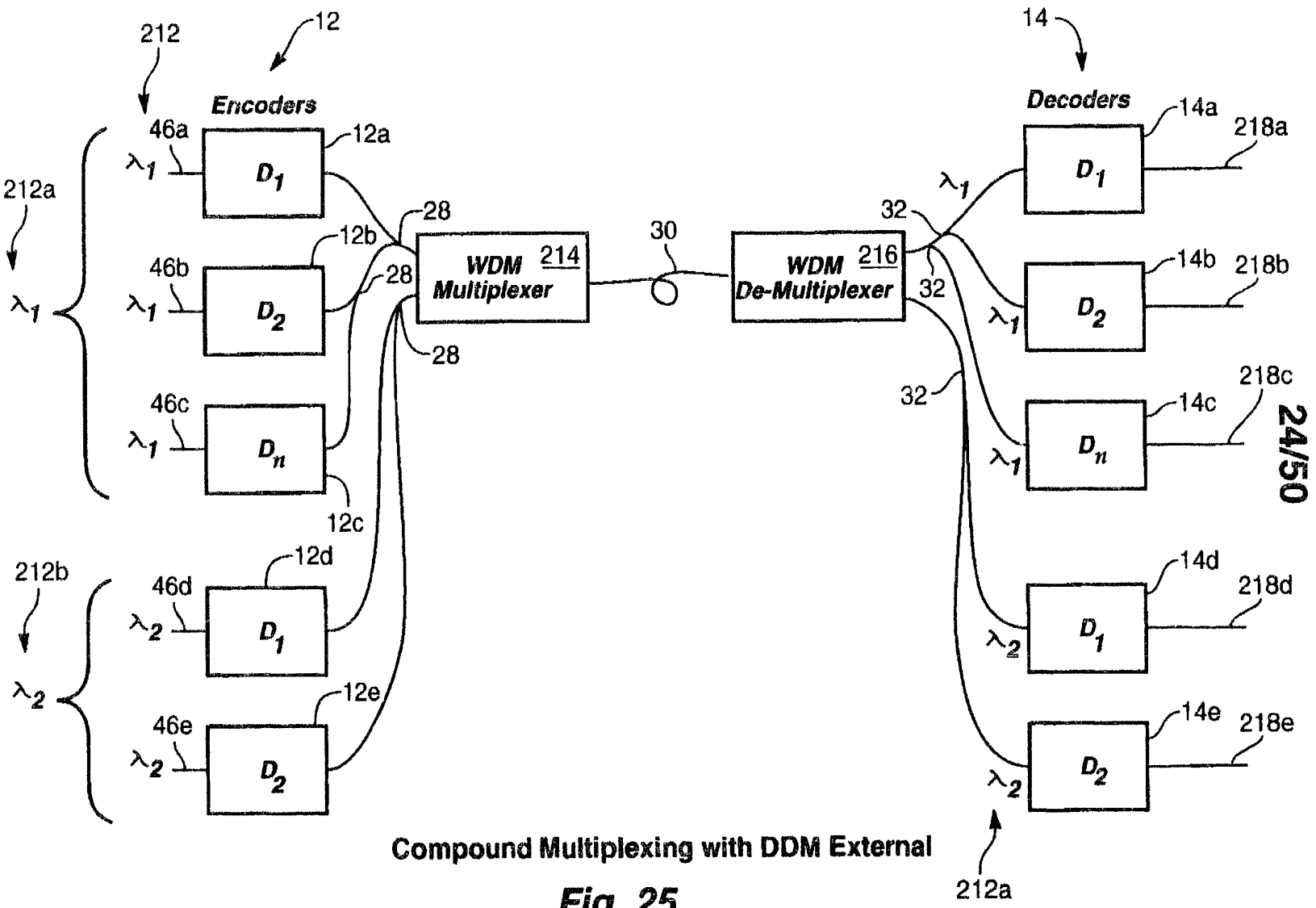

190
194
Fiber
14
Decoders
D1 200
D2 202
D3 204
205a
205b
199
Control Signal
192
Fiber
12
Encoders
D1 211
D3 208
D2 206
196
Fiber
203
201
209b
209c
209d
209a
Content-Based Channel-Selection Processor 207
D1 210
198
Fiber
Drop/Rearrange/Add
Unbuilding/Rebuilding

Fig. 24



Compound Multiplexing with DDM External

Fig. 25

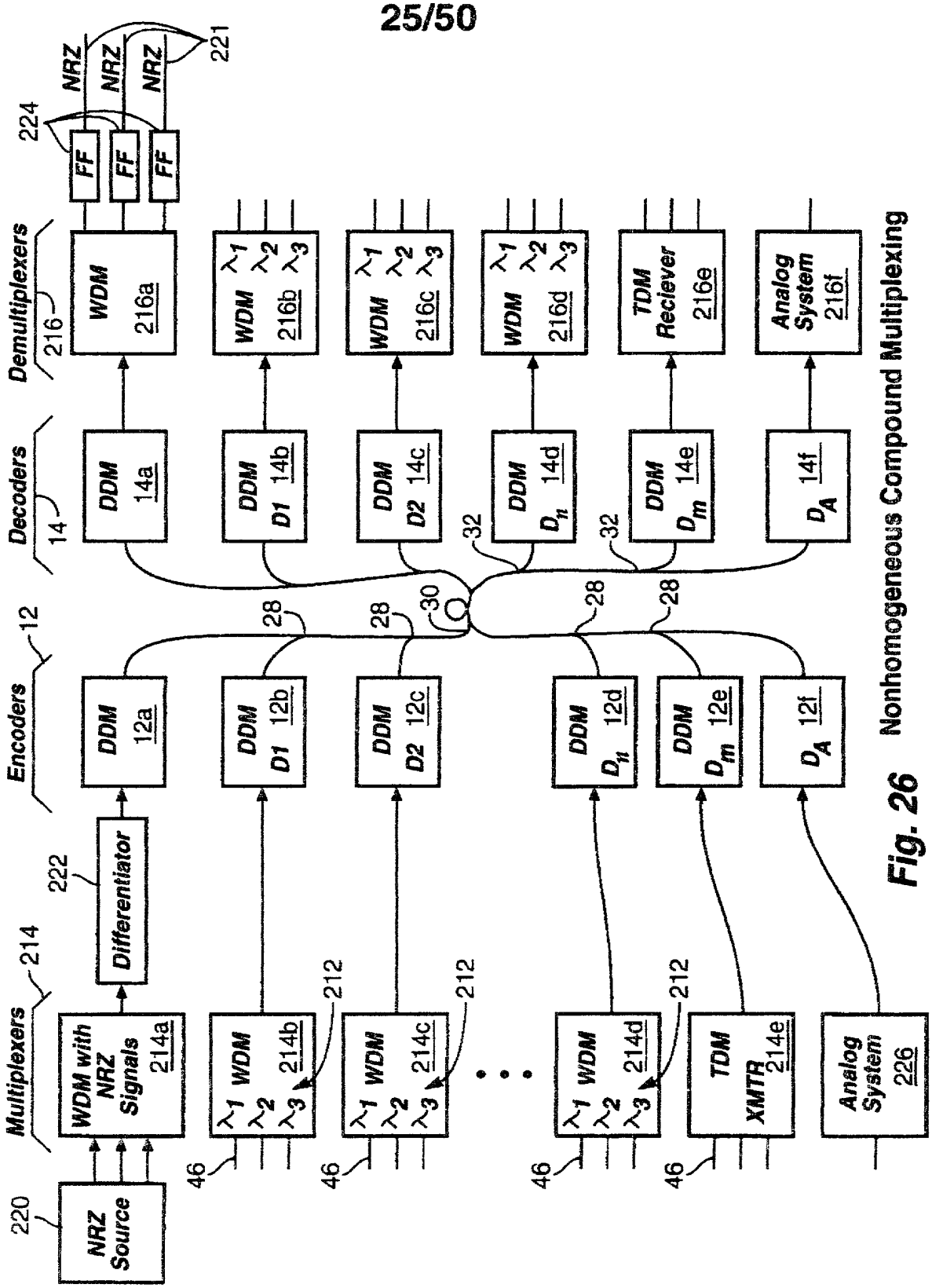
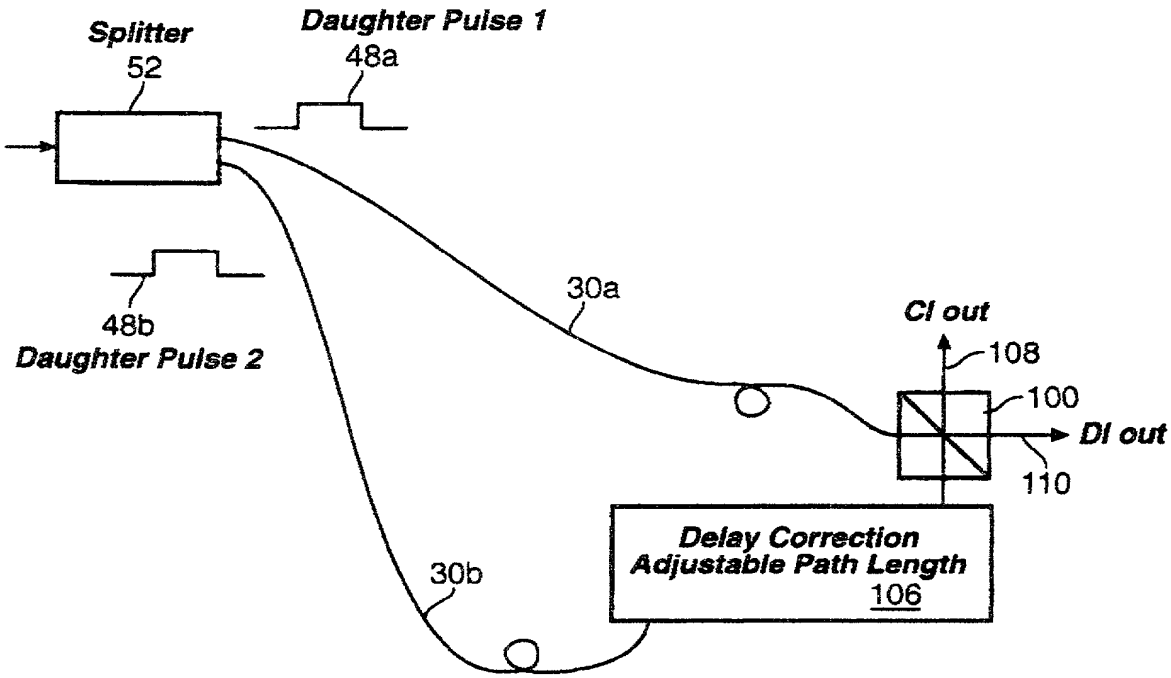


Fig. 26 Nonhomogeneous Compound Multiplexing



Multiple Delay Path

Integrated Delay and Delay Correction

FIG. 27

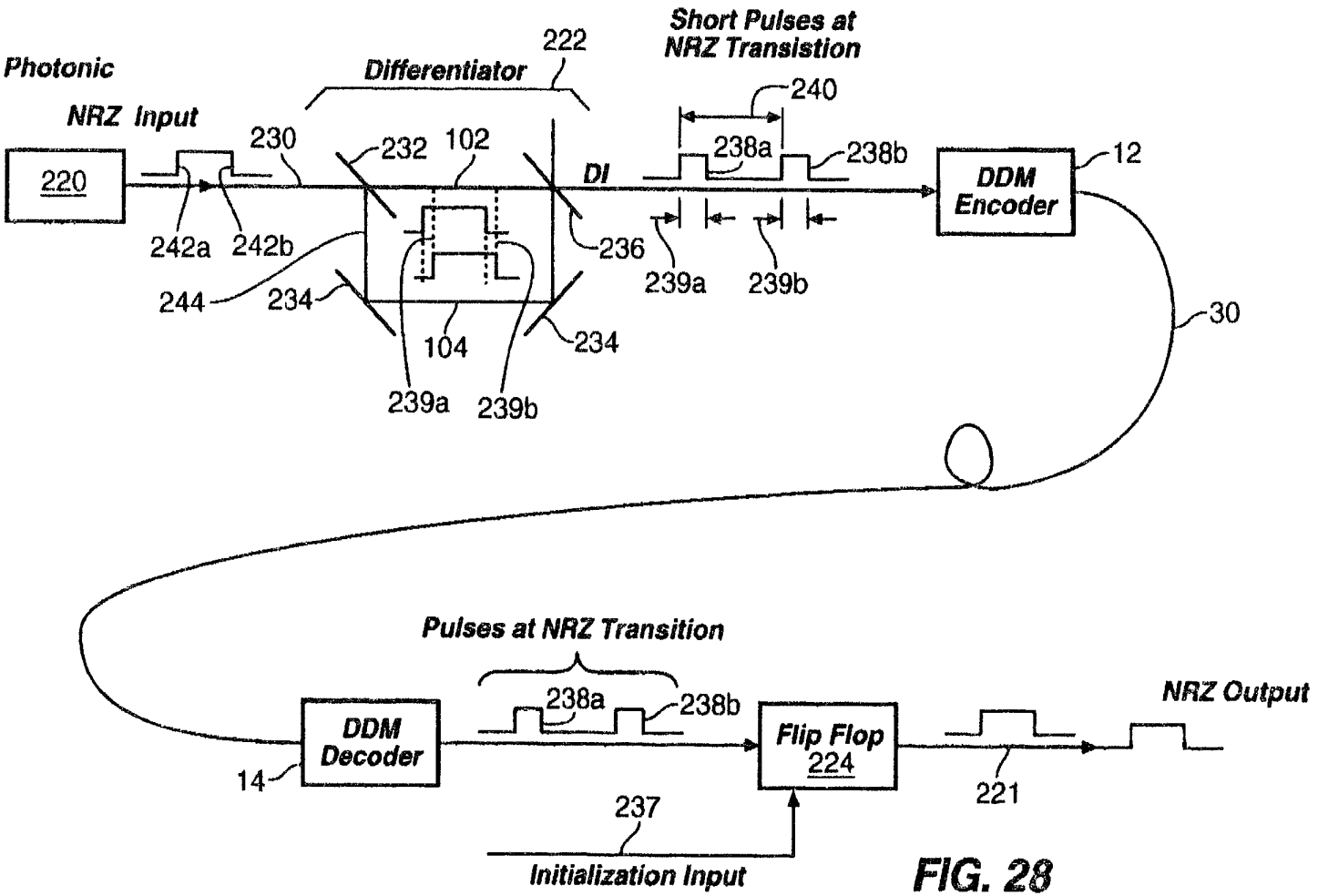

Photonic NRZ Interface
Photonic
NRZ Input
220
230
Differentiator
222
232
102
Short Pulses at
NRZ Transistion
240
238a
238b
DI
DDM
Encoder
12
242a
242b
244
234
236
239a
239b
104
30
Pulses at NRZ Transition
DDM
Decoder
14
238a
238b
Flip Flop
224
NRZ Output
221
237
Initialization Input

FIG. 28

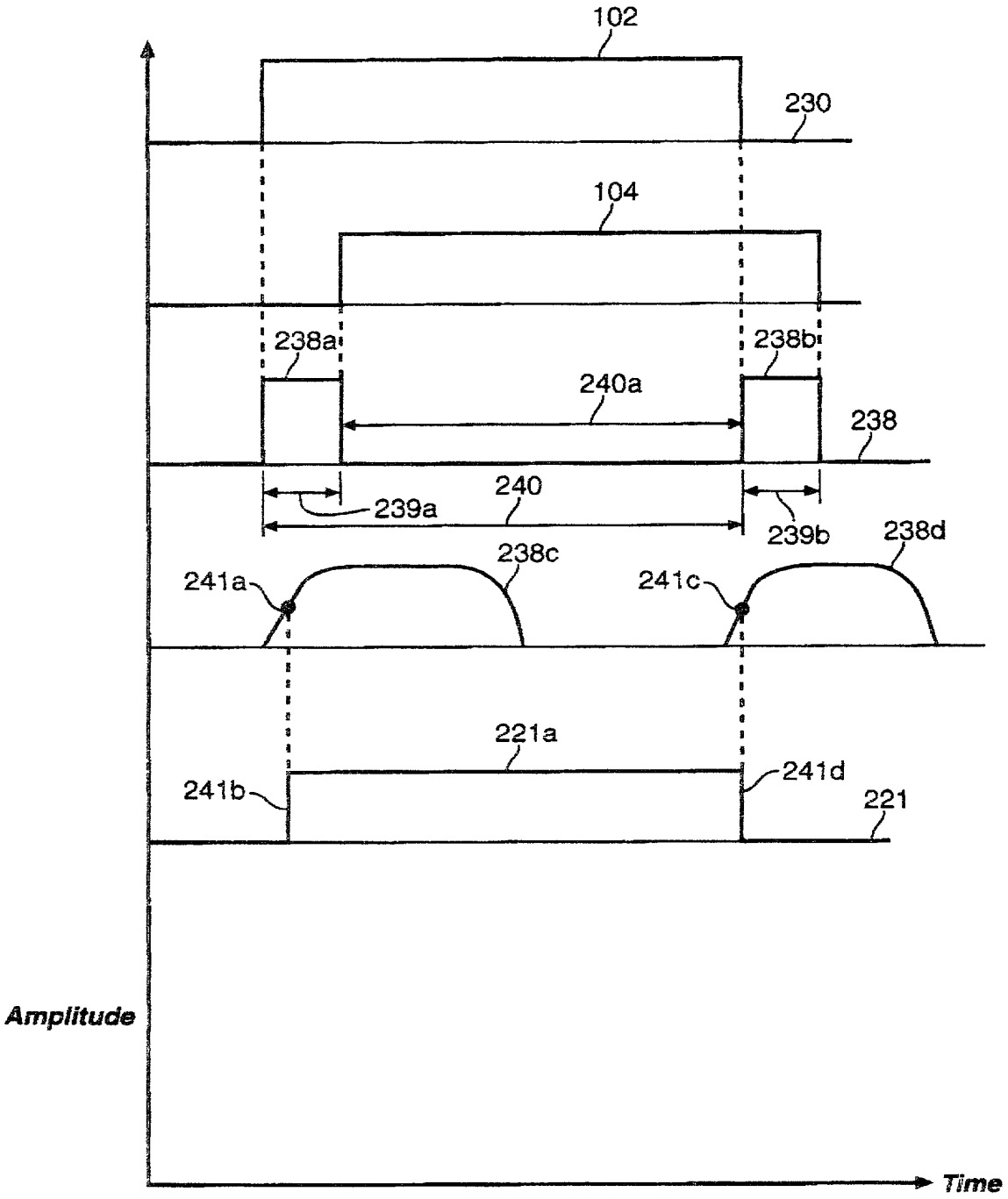
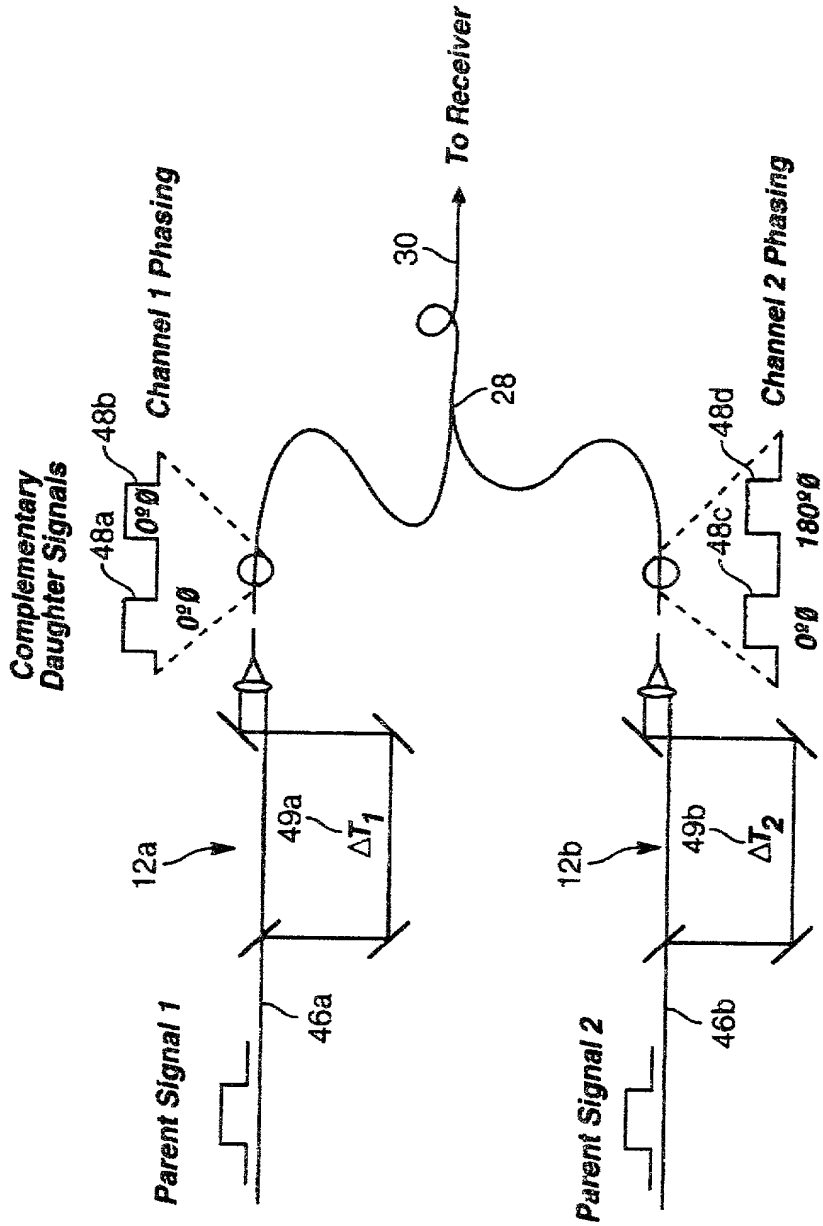

102
230
104
238a
238b
240a
238
240
239a
239b
238d
238c
241a
241c
221a
241b
241d
221
Amplitude
Time

FIG. 29



Phase Sequenced Dual Channel Encoder

FIG. 30

Phase Sequenced Dual Channel Decoder

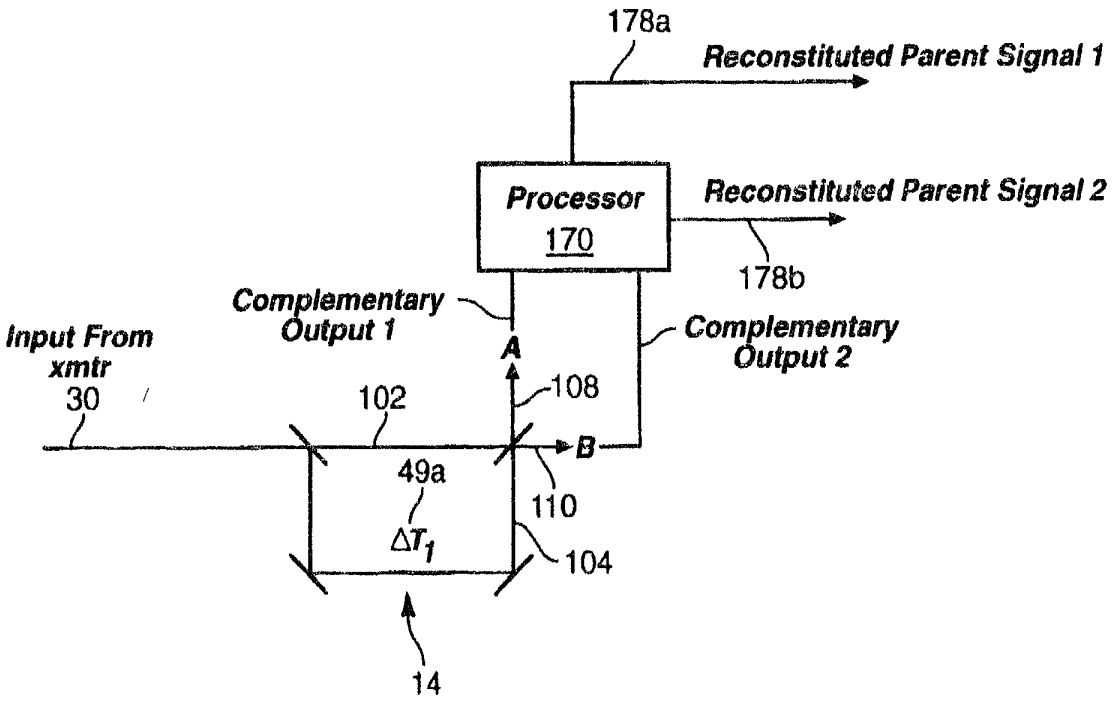


FIG. 31

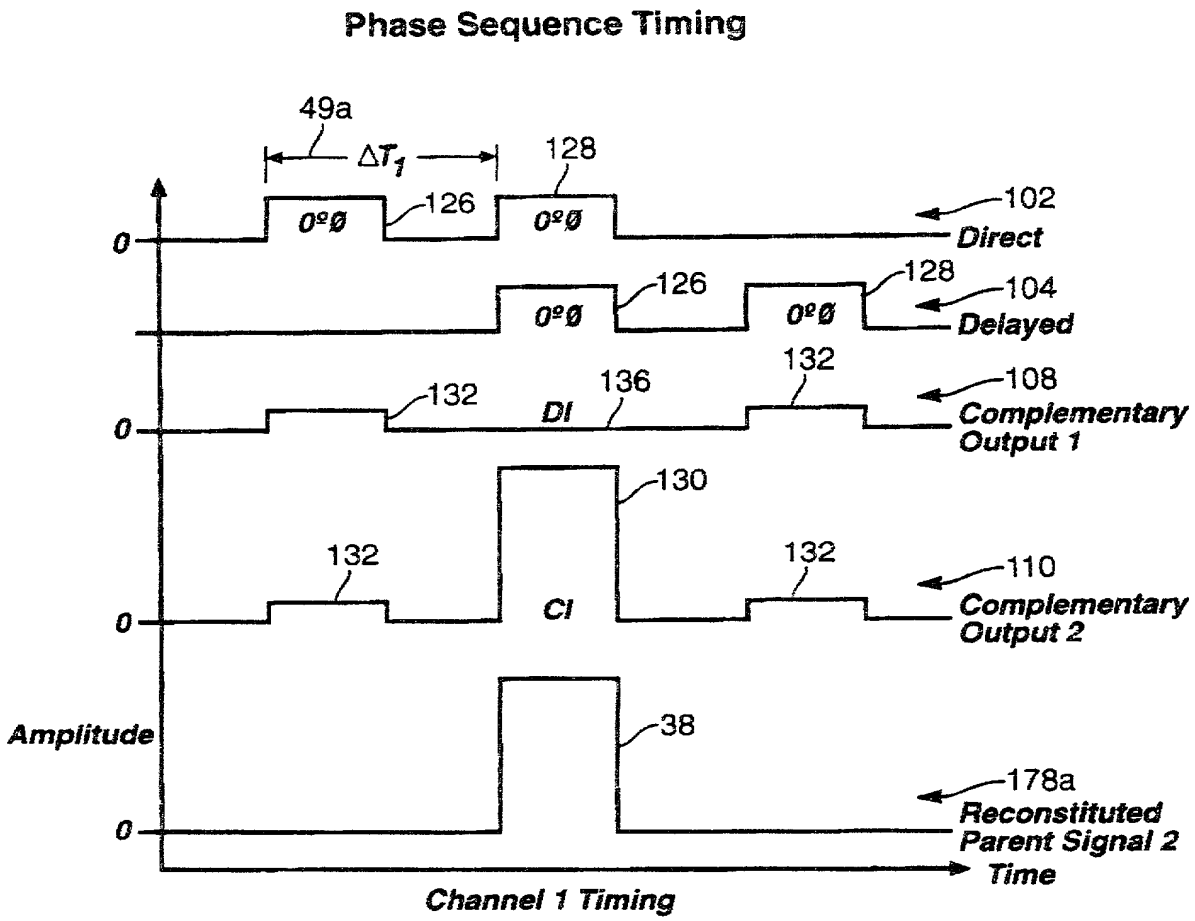

Phase Sequence Timing
49a
ΔT_1
128
126
0ºØ
0ºØ
102
Direct
0
126
128
0ºØ
0ºØ
104
Delayed
132
136
132
108
DI
Complementary Output 1
0
130
132
132
110
CI
Complementary Output 2
0
Amplitude
38
178a
Reconstituted Parent Signal 2
0
Time
Channel 1 Timing

FIG. 32

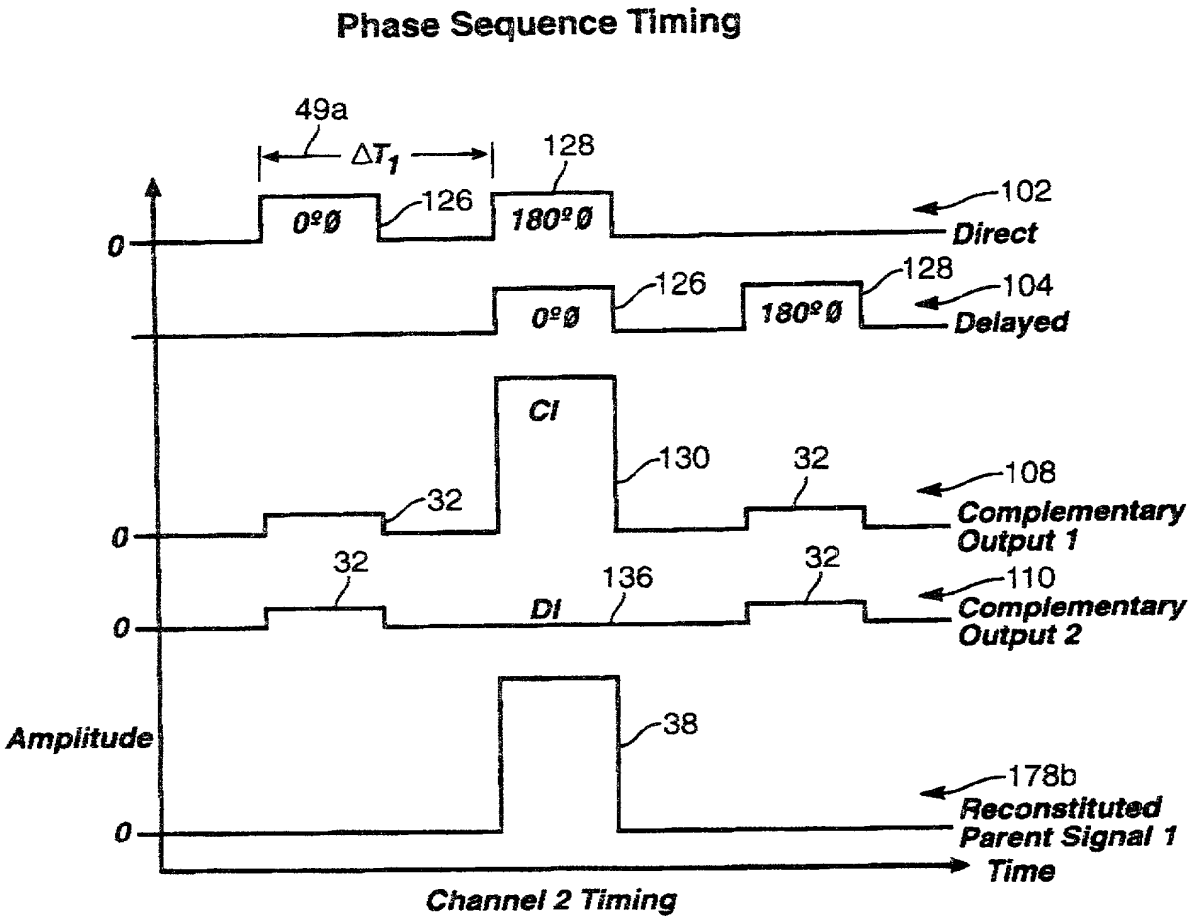

Phase Sequence Timing
49a
ΔT_1
128
126
102
0º∅
180º∅
Direct
0
126
128
104
0º∅
180º∅
Delayed
CI
130
32
108
32
Complementary
Output 1
0
32
136
32
110
DI
Complementary
Output 2
0
Amplitude
38
178b
Reconstituted
Parent Signal 1
0
Time
Channel 2 Timing

FIG. 33

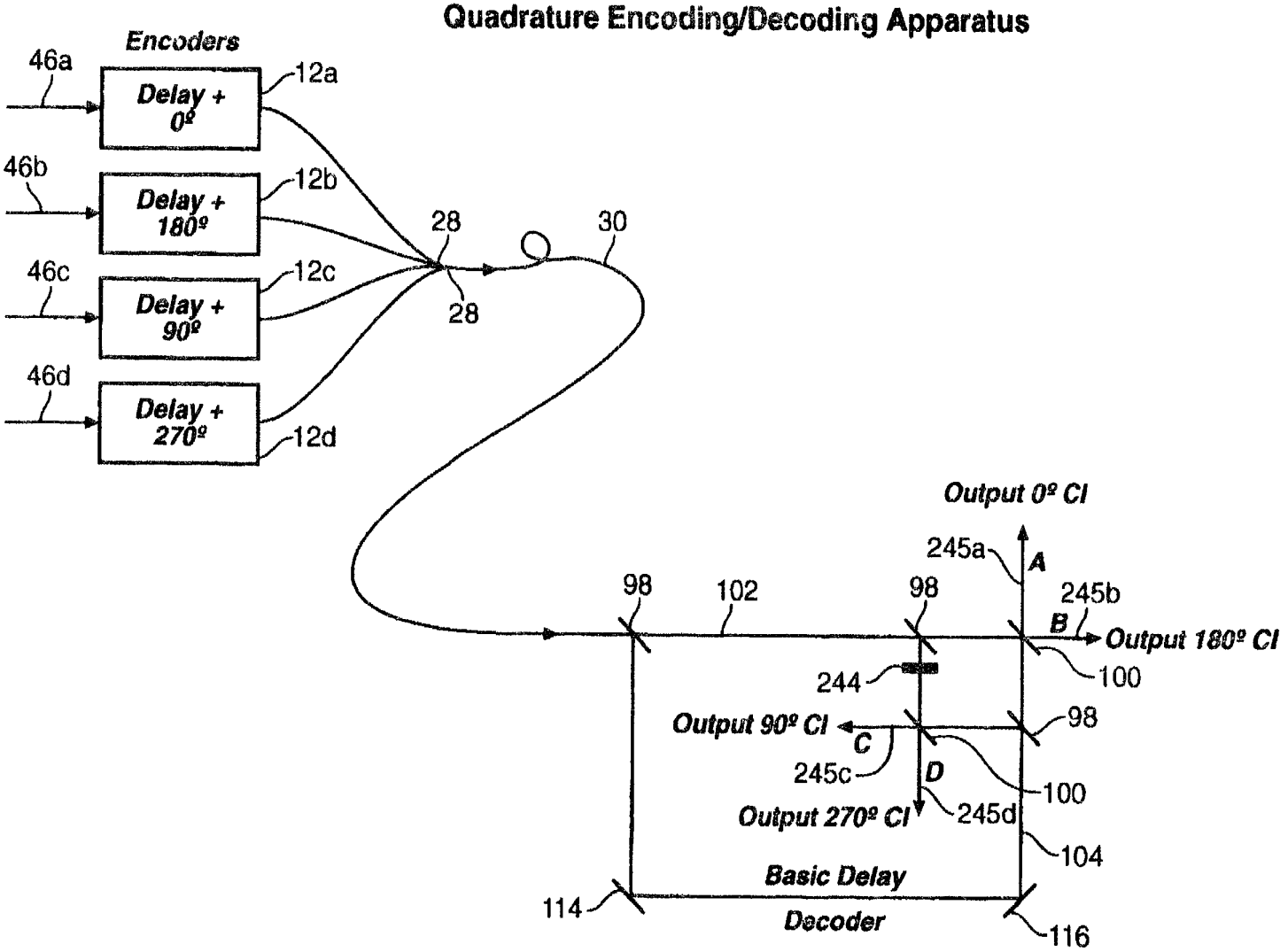

Quadrature Encoding/Decoding Apparatus
Encoders
46a
Delay + 0º
12a
46b
Delay + 180º
12b
46c
Delay + 90º
12c
46d
Delay + 270º
12d
28
28
30
Output 0º CI
245a
A
98
102
98
245b
B
Output 180º CI
244
100
Output 90º CI
C
98
245c
D
100
Output 270º CI
245d
104
Basic Delay
114
Decoder
116

FIG. 34

		Phase of Direct Signal	Phase of Delayed Signal	Quadrature Outputs A	B	C	D
46a	Channel 1	0	0	CI	DI	C =	D
46b	Channel 2	0	180	DI	CI	C =	D
46c	Channel 3	0	90	A =	B	CI	DI
46d	Channel 4	0	270	A =	B	DI	CI
				245a	245b	245c	245d

FIG. 35

Quadrature Wave Forms For One Channel

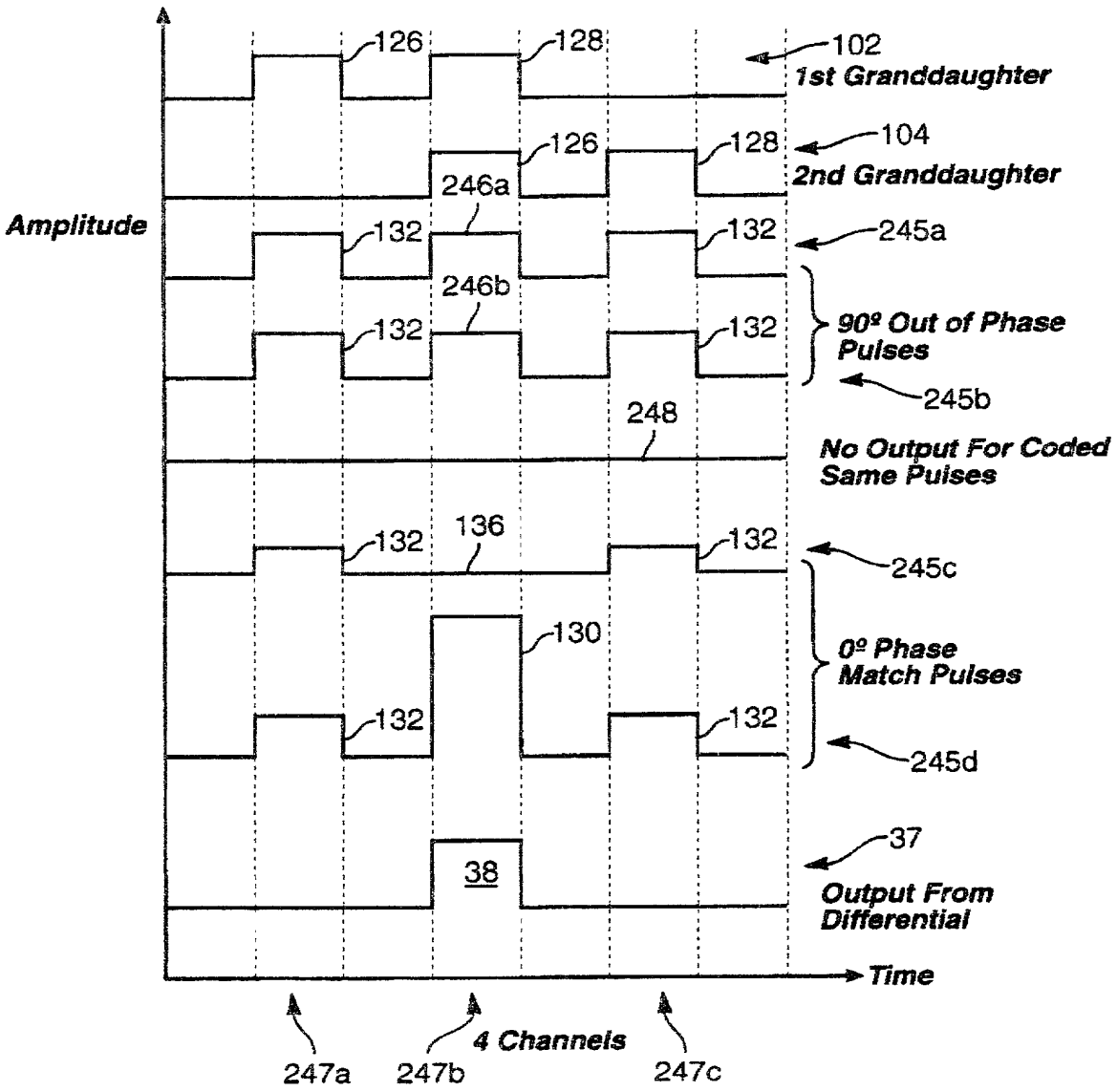


FIG. 36

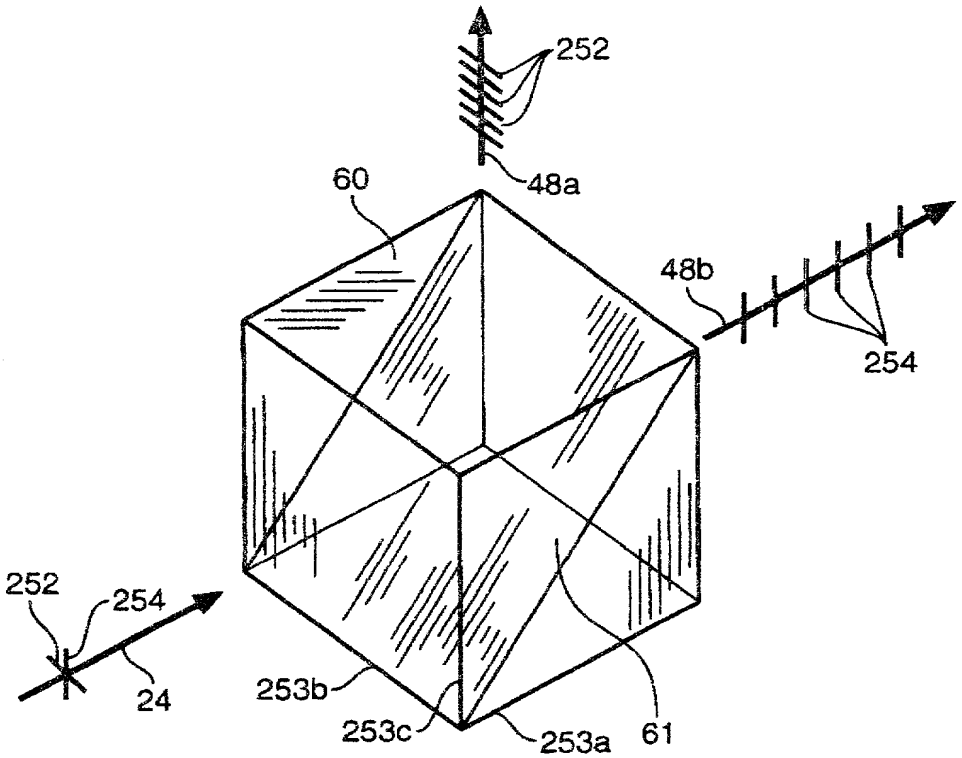


FIG. 37A

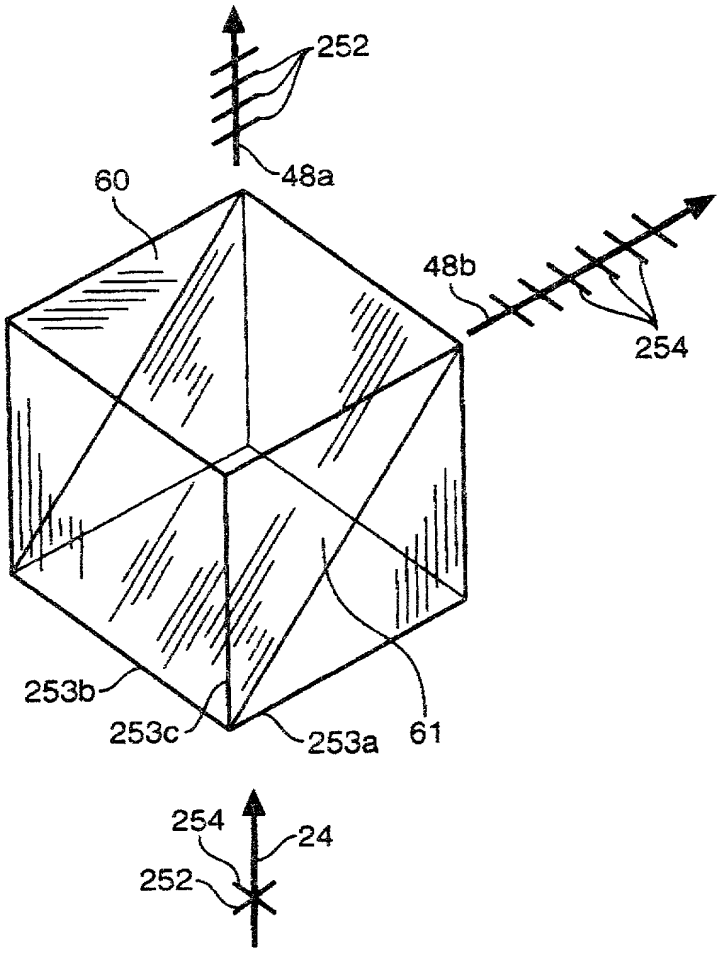
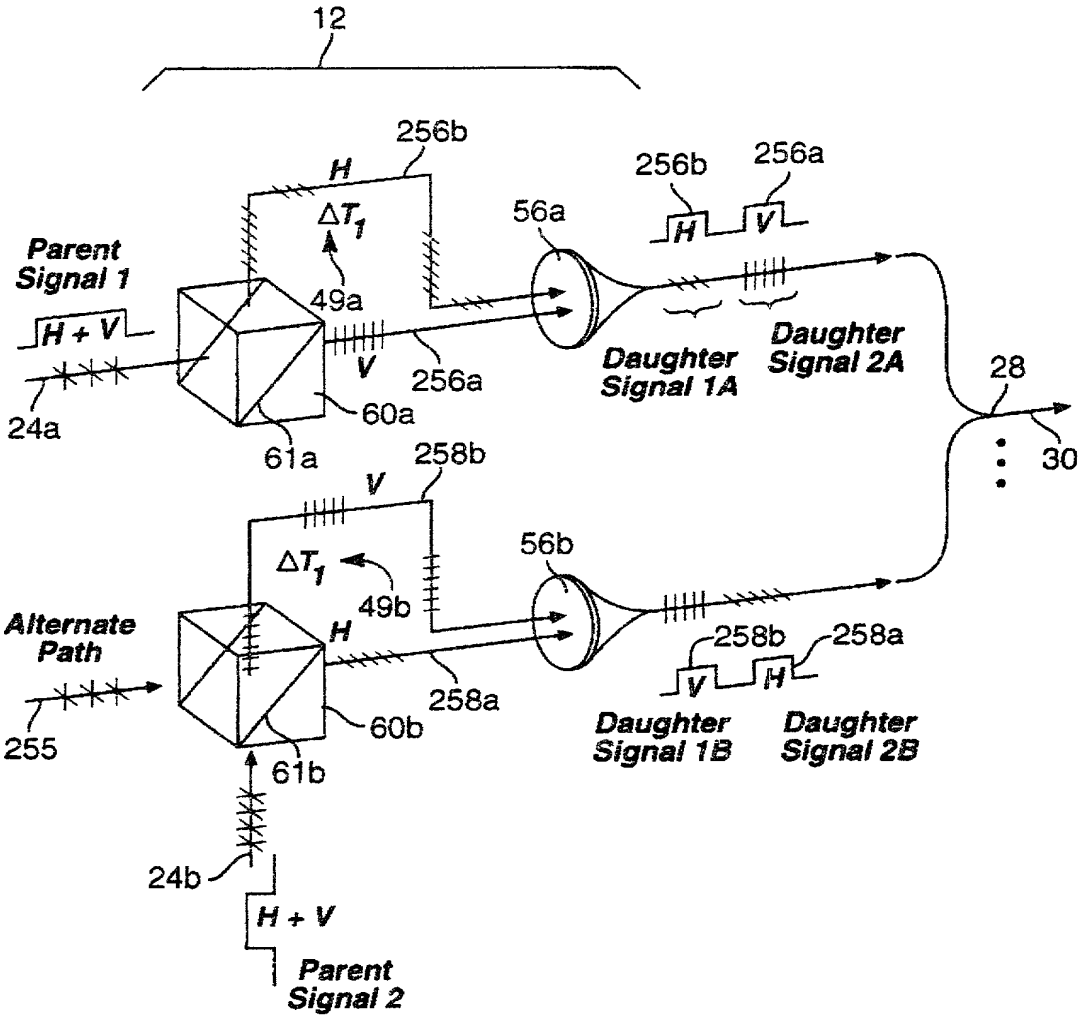
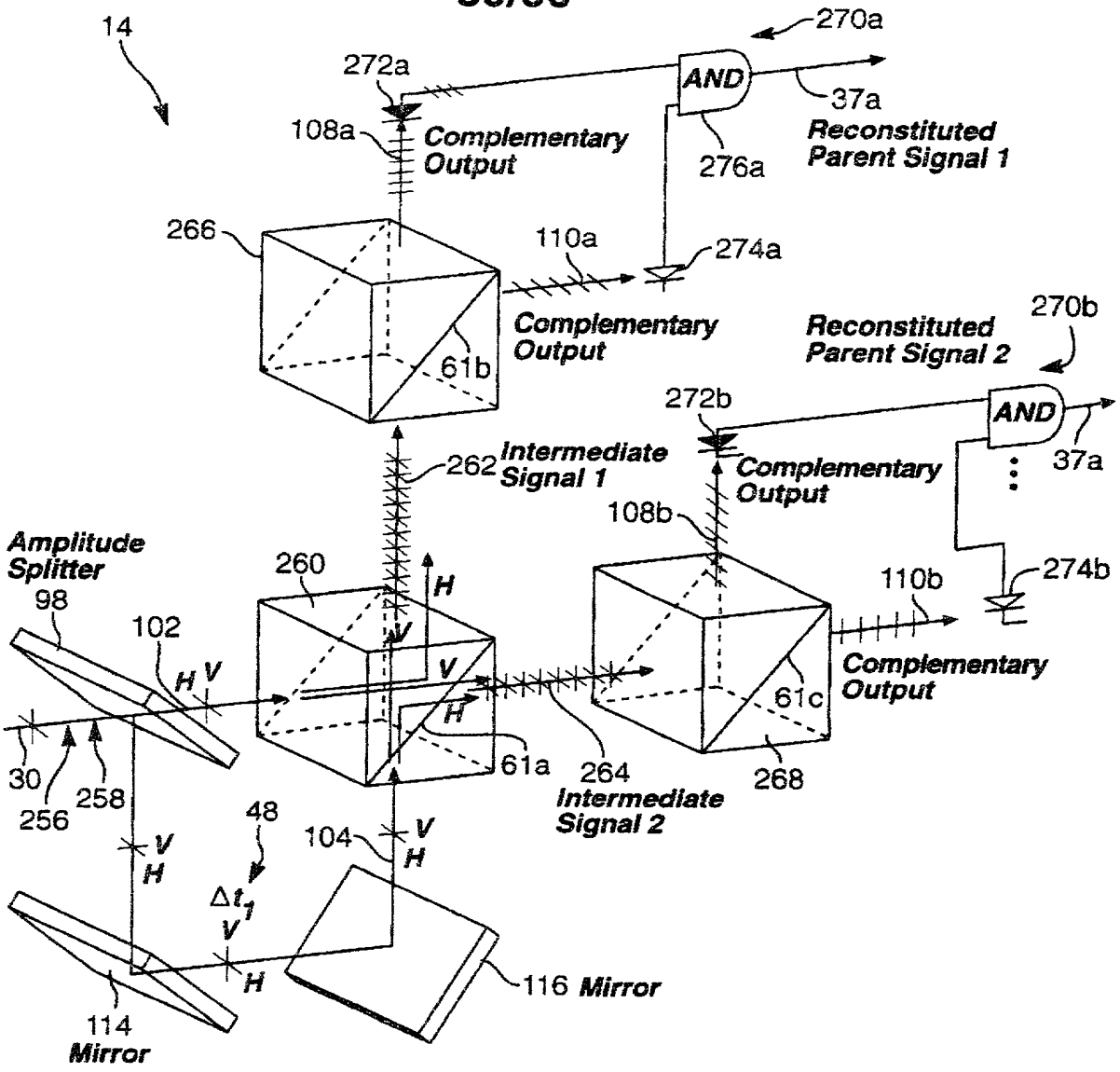


FIG. 37B



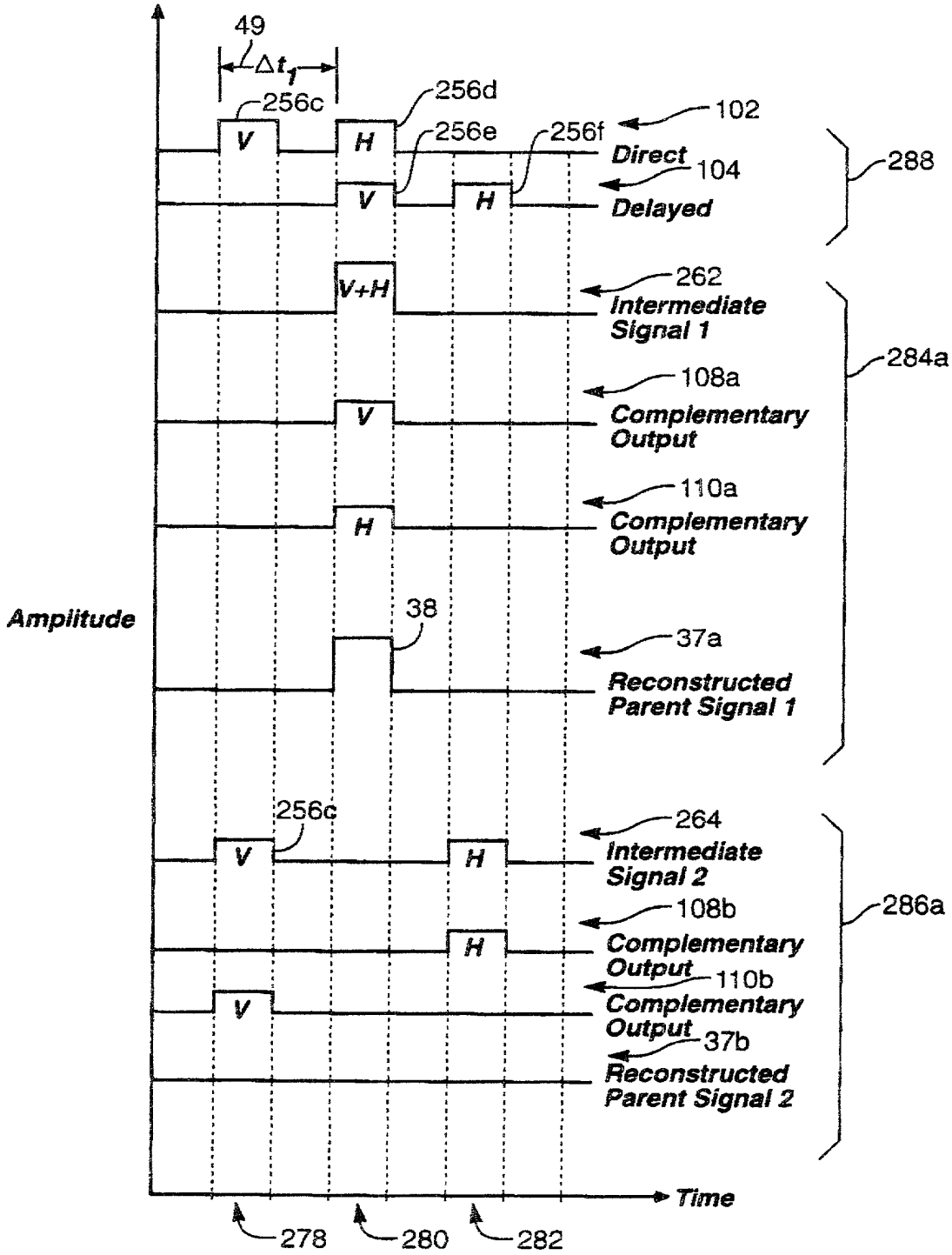
Double Encoder With Polarizations Sequenced to Differentiate 2 Channels Having the Same Time Delay Between Daughter Signals

FIG. 38



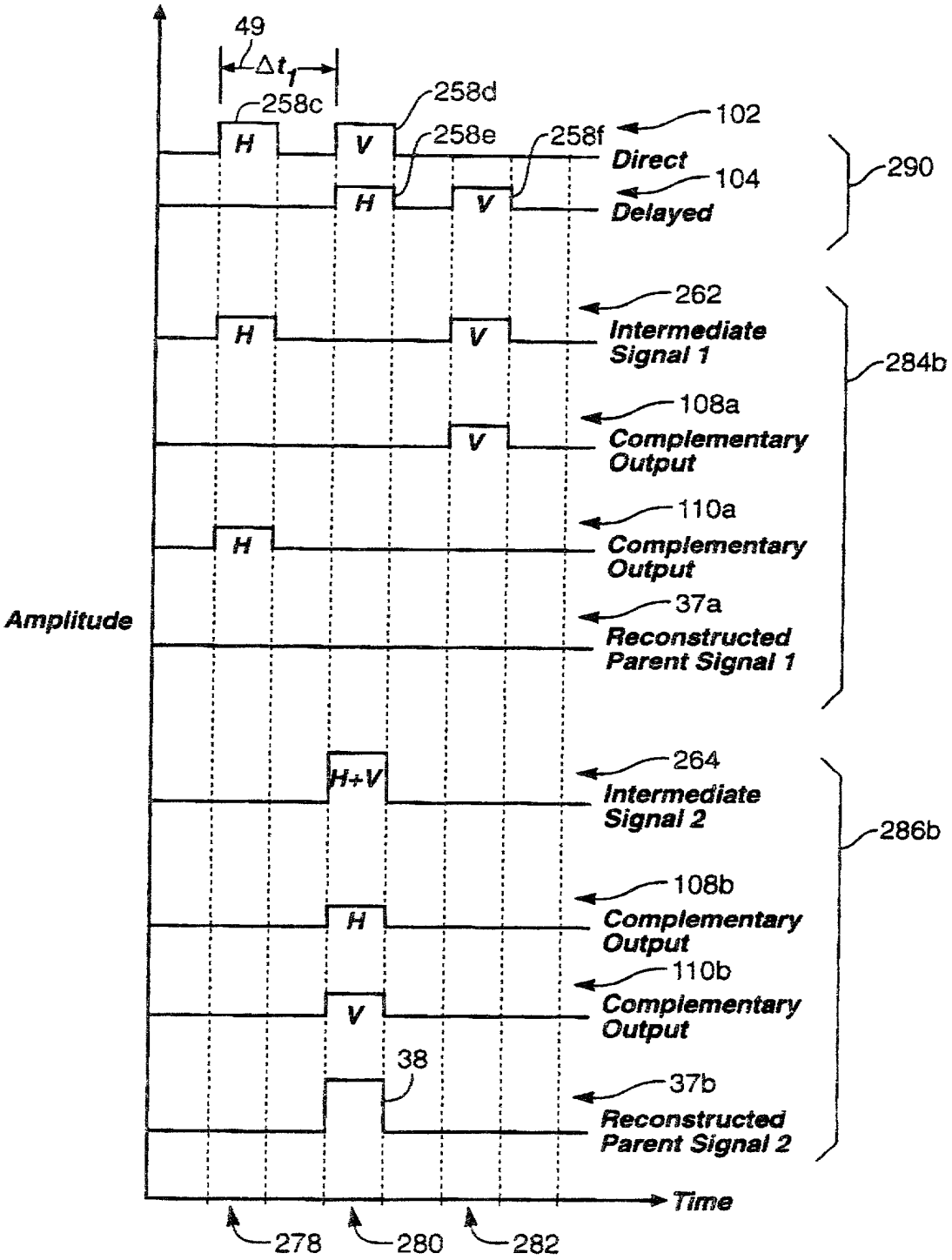
Double Decoder With Polarizations Sequenced to Differentiate 2 Channels Having the Same Time Delay Between Daughter Signals

FIG. 39



Polarization Sequenced Channel 1 Timing

FIG. 40



Polarization Sequenced Channel 1 Timing

FIG. 41

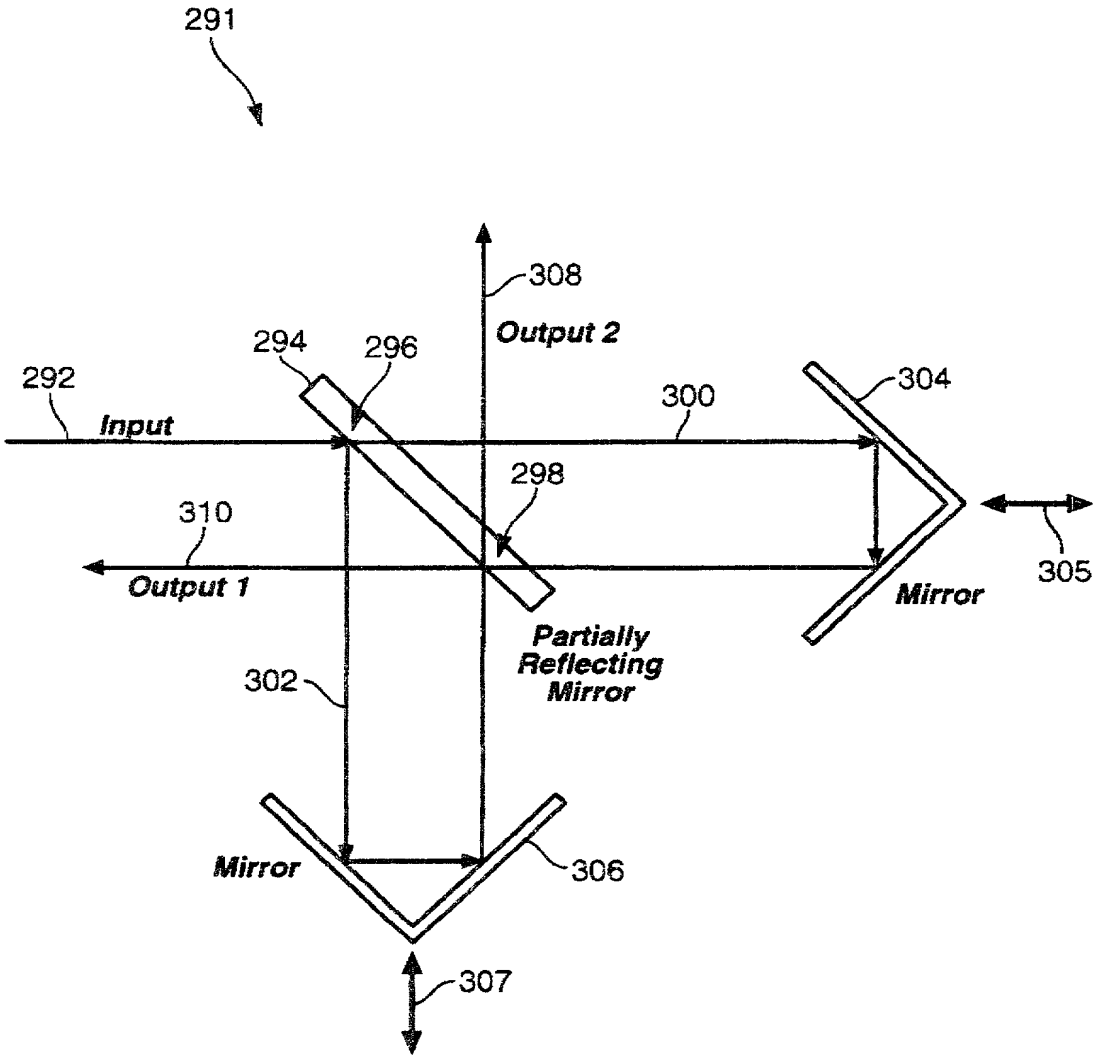

291
308
Output 2
294
296
292
Input
300
304
298
310
Output 1
305
Mirror
Partially
Reflecting
Mirror
302
Mirror
306
307

FIG. 42

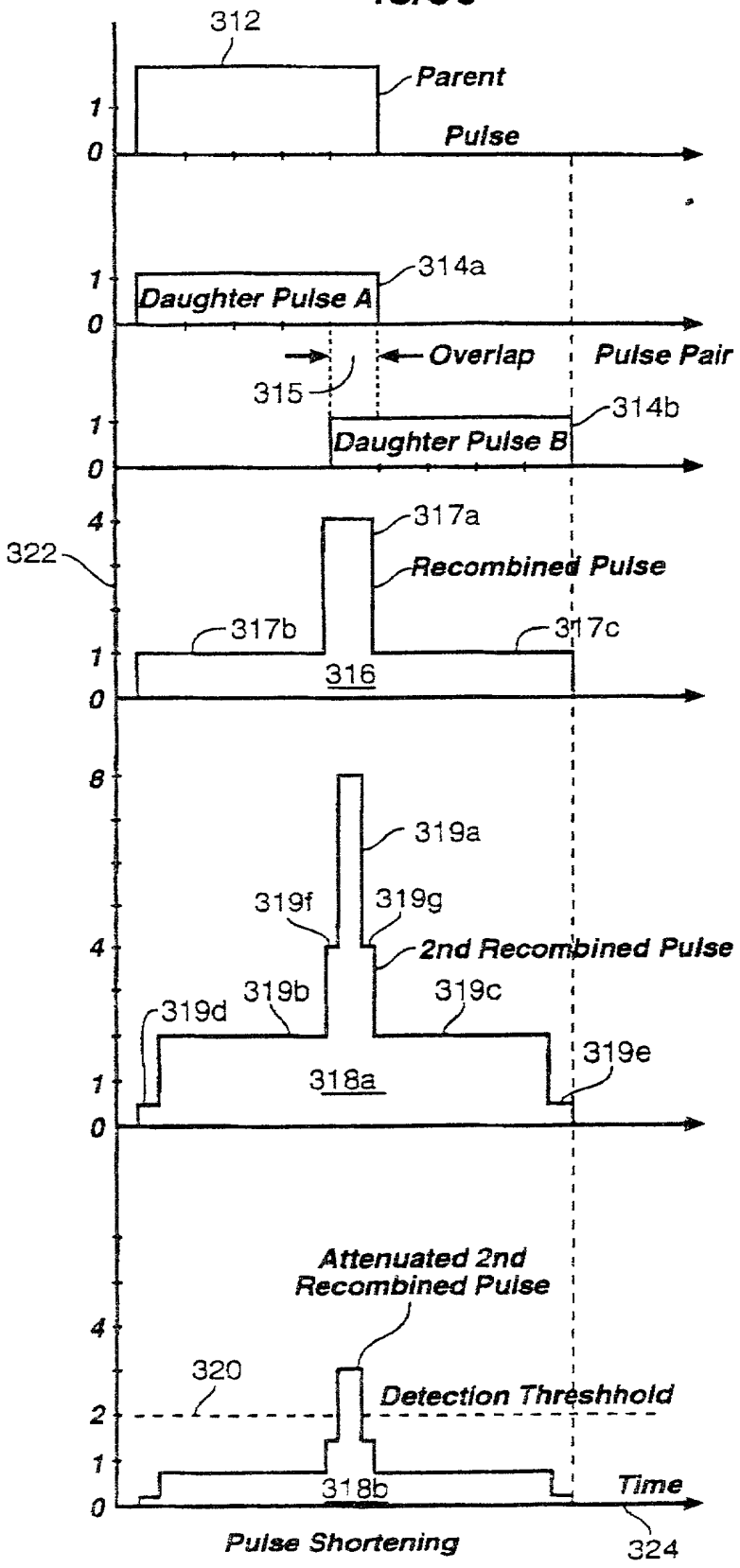

312
Parent
Pulse
1
0
314a
Daughter Pulse A
Overlap
Pulse Pair
315
314b
Daughter Pulse B
4
322
317a
Recombined Pulse
317b
317c
316
8
319a
319f
319g
2nd Recombined Pulse
319b
319c
319d
319e
318a
Attenuated 2nd
Recombined Pulse
320
Detection Threshhold
2
318b
Time
Pulse Shortening
324

FIG. 43

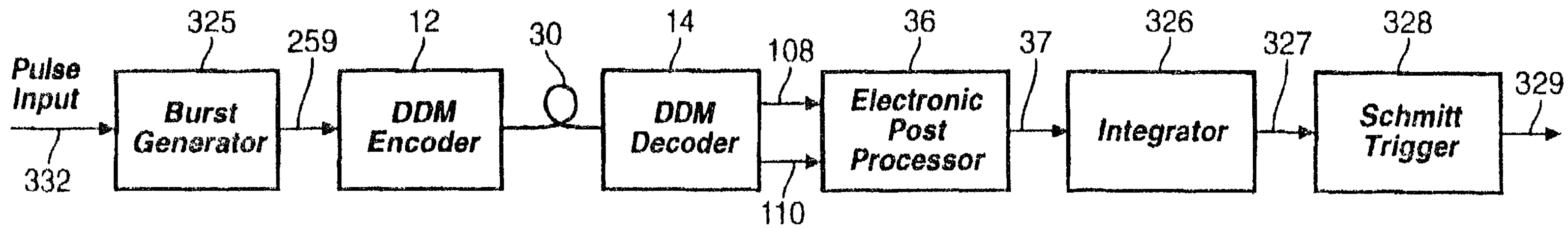

Pulse Input
332
325
Burst Generator
259
12
DDM Encoder
30
14
DDM Decoder
108
110
36
Electronic Post Processor
37
326
Integrator
327
328
Schmitt Trigger
329

FIG. 44

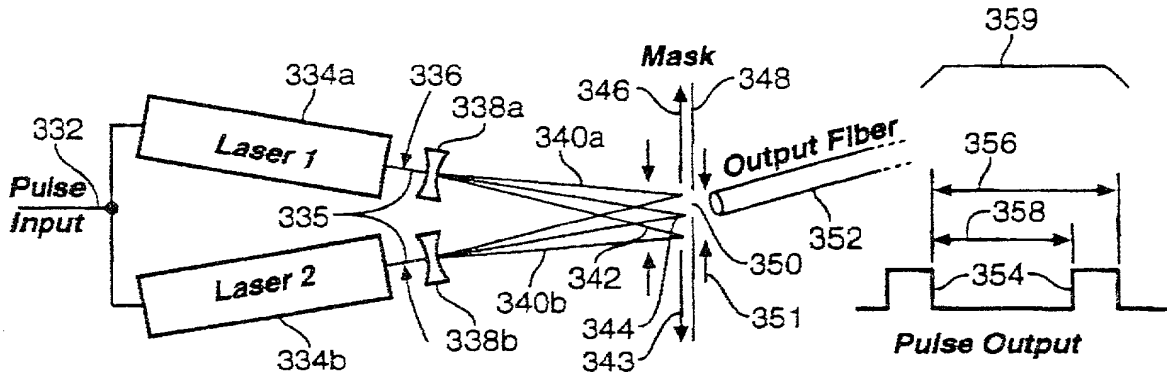

359
Mask
334a
336
346
348
338a
332
Laser 1
340a
Output Fiber
356
Pulse
Input
335
358
352
Laser 2
342
350
340b
354
344
351
338b
334b
343
Pulse Output

FIG. 45

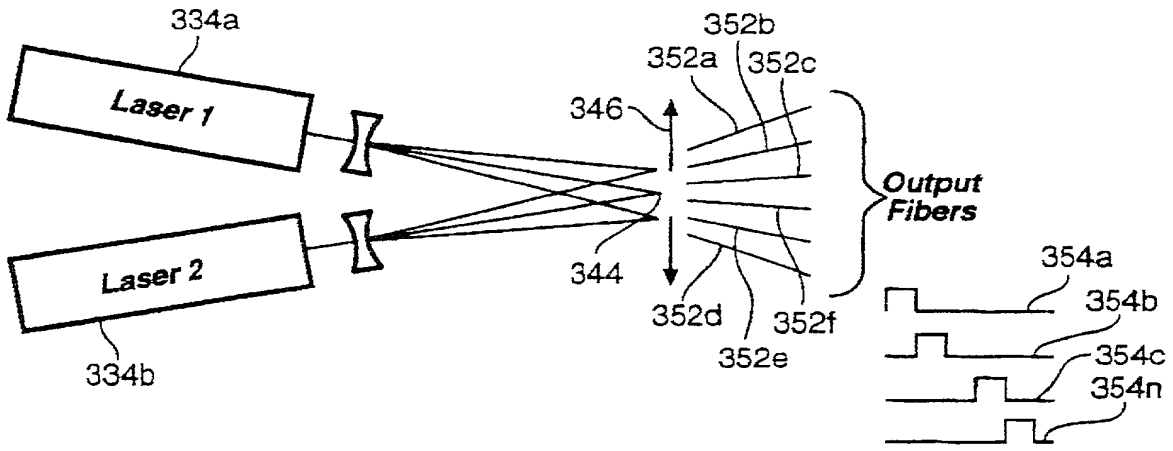

334a
Laser 1
Laser 2
334b
346
344
352a
352b
352c
352d
352e
352f
Output Fibers
354a
354b
354c
354n

FIG. 46

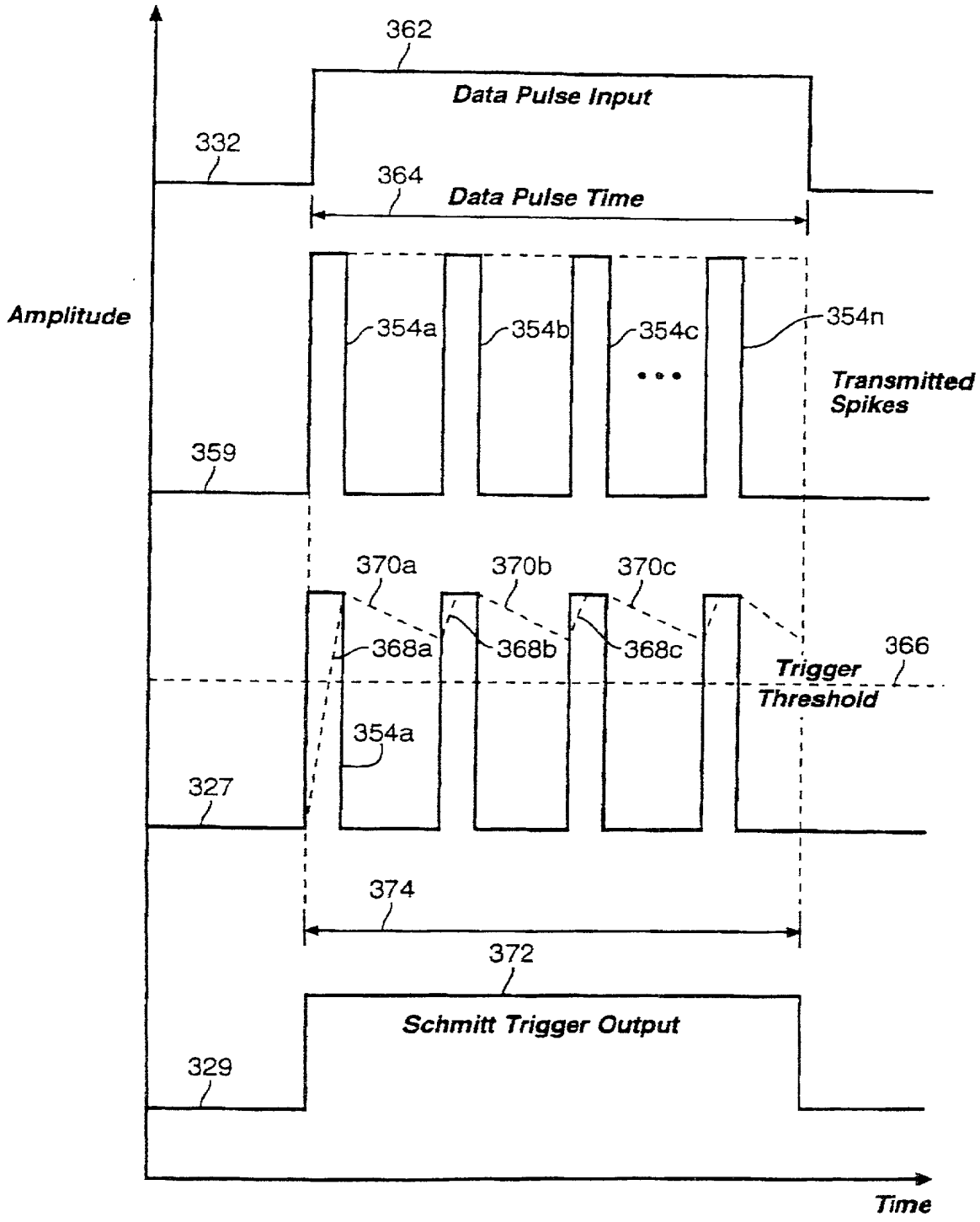

362
Data Pulse Input
332
364
Data Pulse Time
Amplitude
354a
354b
354c
354n
Transmitted Spikes
359
370a
370b
370c
368a
368b
368c
366
Trigger Threshold
354a
327
374
372
Schmitt Trigger Output
329
Time

FIG. 47

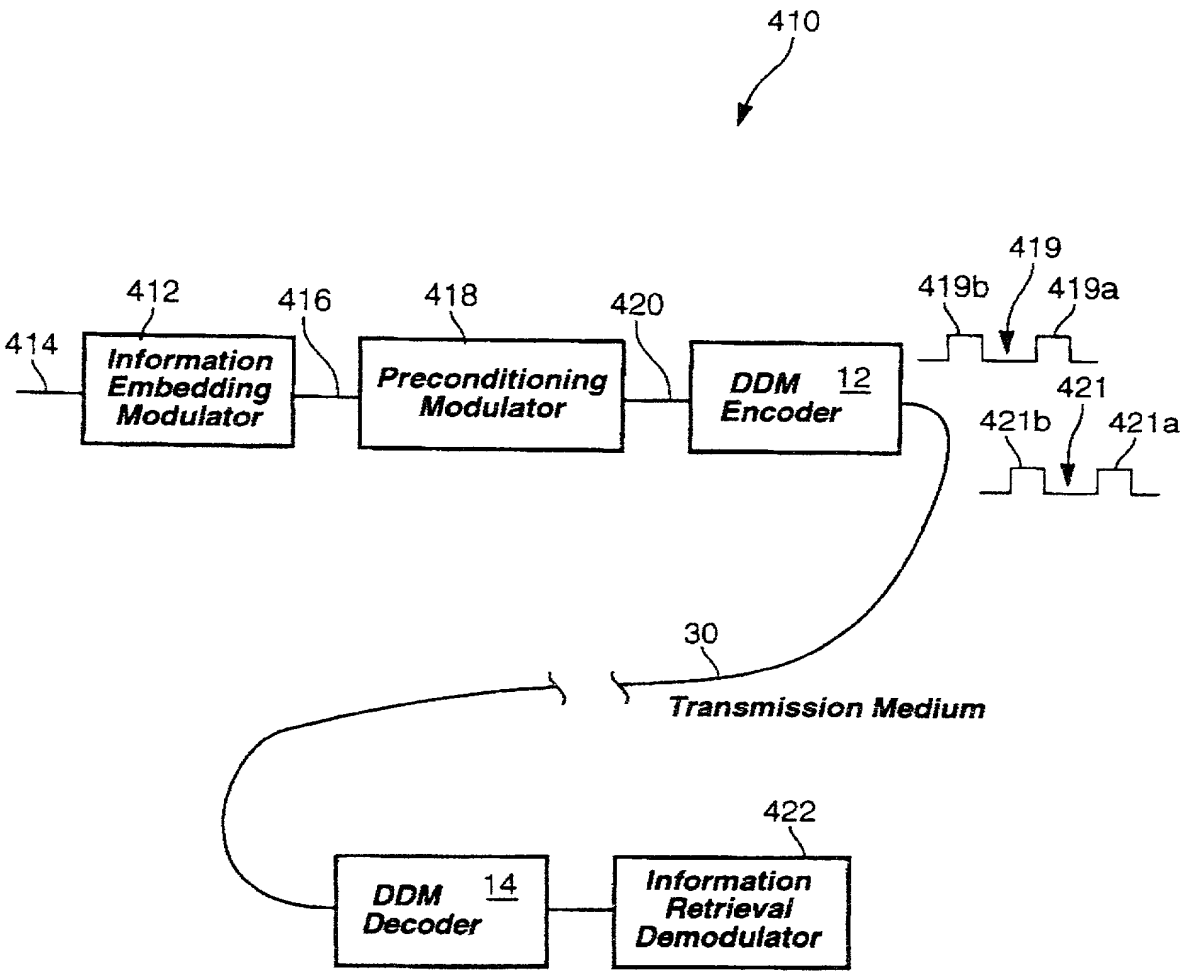

410
412
414
Information Embedding Modulator
416
418
Preconditioning Modulator
420
DDM 12 Encoder
419
419b
419a
421
421b
421a
30
Transmission Medium
422
DDM 14 Decoder
Information Retrieval Demodulator

FIG. 48

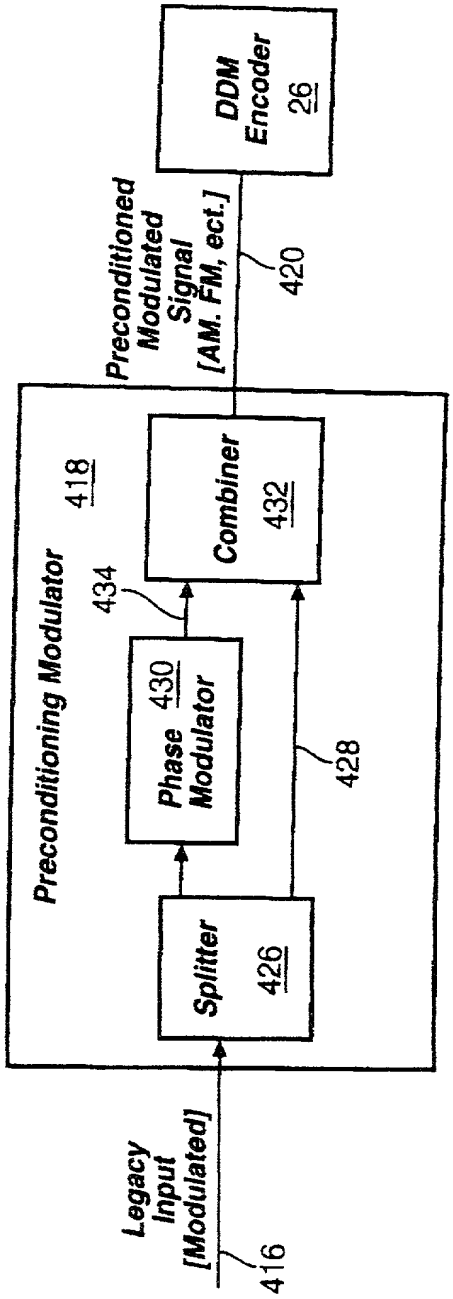

Legacy Input [Modulated]
416
Preconditioning Modulator
418
Splitter
426
Phase Modulator
430
434
428
Combiner
432
Preconditioned Modulated Signal [AM, FM, ect.]
420
DDM Encoder
26

FIG. 49

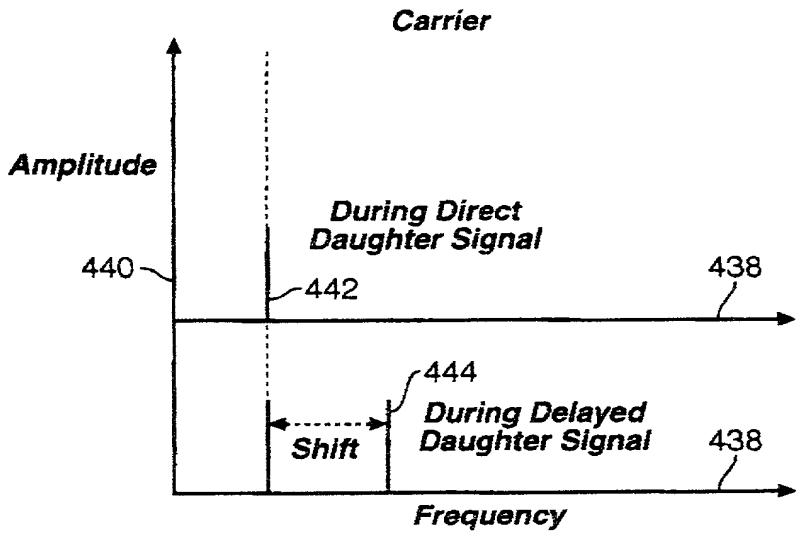


FIG. 50